Network Interface Board

Type2000

For Novell NetWare®, Apple Talk, and TCP/IP Networks

Owner's Manual

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UE GB

A855-7500

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However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and receiver.
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
Consult the dealer or an experienced radio/TV technician for help.

Declaration of Conformity

Product Name: Network Interface Board
Model Number: G919-17
Responsible party: Ricoh Corporation
Address: 5 Dedrick Place, West Caldwell, NJ 07006
Telephone number: 973-882-2000
This device complies with part 15 of FCC Rules.
Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. this device must accept any interference received,
including interference that may cause undesired operation.

Note to users in Canada

Note:
This Class B digital apparatus complies with Canadian ICES-003.

Remarque concernant les utilisateurs au Canada

Avertissement:
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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Chapter 1 Introduction

The Network Interface Board is an optional device, which is installed into compatible printers to provide Ethernet network connectivity. The Network Interface Board has the following features:

- Automatic selection of 10BaseT/100BaseTX Ethernet connection.
- Fully transparent AppleTalk printing support for the Macintosh, including support for binary PostScript printing.
- Peer-to-Peer (serverless) discovery and printing from Windows 95/98 or Windows NT (4.0 or higher) workstations, without a Novell file server present and without using IP.
- Novell NetWare PSERVER on both bindery based and Novell Directory Services (NDS).
- lpr/lpd over TCP/IP for UNIX platforms and Microsoft's Windows.
- Raw sockets support over selectable TCP/IP port with filters for selected UNIX environments.
- IP and IPX SNMP support of MIB-2 and proprietary NIC MIB.
- SNMP support of standard MIB and proprietary printer MIBs on compatible printers.
- Integral HTTP Server to allow monitoring and management of your Network Interface Board from a standard IP Web Browser program.
- Management Access Program (MAP) to allow Windows-based HTML viewing for monitoring and management of your Network Interface Board.

1.1 What's in Your Package

The Print Server contains the following:

- Network Interface Board
- Quick Configuration Guide booklet for the Network Interface Board
- 1 CD-ROM that contains the following
  - This Manual (Serial number A855-7500)
  - Management Access Program (MAP)
  - IPX Peer-to-Peer Windows Redirector
  - IP Peer-to-Peer Windows Redirector
  - NetWare and Print Server Configuration Program (NWSetup)

The MAP directory contains the programs BOOTPL16 for Windows 3.1x and BOOTPL32 for Windows 95/98 and Windows NT 4.0 (to assist entering IP parameters in a Windows environment)

Each directory may contain a README file containing the latest information about the installation and operation. Check for these files before going any further with installation.

1.2 Hardware/NOS Requirements

The Network Interface Board hardware and software require the following:

Version of Protocol or NOS	Novell NetWare Version 3.x, or 4.x.
	Macintosh System 7.x, 8.x
	UNIX, Windows, or LAN Server systems supporting lpr over TCP/IP.
	Novell NetWare printing requires NetWare Capture, NPRINT and PCONSOLE (later than 1.0) utilities.
Software	The IP Peer-to-Peer utility requires Windows NT 4.0 or later; Windows 95 or Windows 98
	The IPX Peer-to-Peer utility requires Windows NT 4.0 or later; Windows 95 or Windows 98
	The MAP utility requires Windows NT 4.0 or later, Windows 95 or Windows 98. MAP also requires a browser such as Microsoft Internet Explorer (later than 3.02) or Netscape Navigator.
	AppleTalk printing requires printer PPD appropriate to the printer.
	TCP/IP setup and maintenance may be done with Telnet. Monitoring and maintenance with HTTP requires a suitable internet Web Browser program supporting HTML such as Microsoft Internet Explorer 3 or Netscape Navigator.
Hardware	Support for 10 megabit Ethernet networks: 10BaseT (shielded twisted pair) cables and hardware.
	Support for 100 megabit Ethernet networks: 100BaseTX (shielded twisted pair) cables and hardware.
	CD-ROM drive on the workstation to accept Windows utilities.

1.3 Conventions Used in this Document

Through out this document there are instructions. When referring to keys on the keyboard that need to be pressed all caps are used. e.g. Press the **ENTER** key.

Dialog boxes that appear on the screen are referred to using square brackets. e.g. Click on the [**OK**] button.

References are made to the **ENTER** key, this is the same as the **RETURN** key on some keyboards.

Chapter 2 Preparing for Network Connection

2.1 Preparing the Printer

You should generate a status page of the printer before you begin. This will give you detailed information on the identification and configuration of your printer, as well as ensuring that the printer is properly set up and operating.

2.2 Powering Up the Printer

Use the following procedures to power up the printer. Do this before the printer is attached to the network to verify the physical installation of the Network Interface Board.

1. Plug in the power cord.
2. Turn on the power and wait for the printer to warm up.
   The Network Interface Board provides a print job to the printer which contains the Network Interface Board status information.
   ⇨ Refer to 8.2 Status Report, for more information.
3. Check the Network Interface Board status report. Record the serial number and the Network address or save the status report.
   You need this information when you configure the printer for your network.
4. Power down the printer.

Connect the network cable between the Network Interface Board and a network drop.

Chapter 3
Using the Management Access Program or a Standard Web Browser

MAP has the following requirements:

- The Microsoft TCP/IP protocol stack, the Microsoft IPX protocol stack, or Novell NetWare 32-bit IPX protocol stack must be installed on this PC.
- A web browser must be installed on this PC. Both Netscape Navigator and Microsoft Internet Explorer (3.02 or later) are supported.

The Management Access Program (MAP) uses a Windows-based HTML viewer program linked with a proprietary bi-directional IPX/IP channel program to allow access to the Network Interface Board's HTML-based monitoring and maintenance capabilities. An IP Web Browser also provides access to this capability directly. Either program allows you to:

- Configure your network protocols for the Network Interface Board.
- Reset the Network Interface Board remotely to either clear an error condition, or return the print server to its factory default settings.
- Troubleshoot problems in the Network Interface Board.
- Enable or disable the status sheet printout.
- Access a context-sensitive help menu that fully explains how to use each Management Access Program feature.
- Access the online help that explains how to use the many features of this program.

Note: *Some functions provided with the Management Access Program or the Web Browser require a password. The factory default password is "**sysadm**".*

3.1 Where to Place the MAP

The utility can be installed on any workstation hard drive or network drive.

3.2 How to Install MAP

The Management Access Program must be installed from Windows 95/98 or NT 4.0, it **CANNOT** be installed from DOS or Windows 3.1x.
Use the following procedures to install:

1. Start Windows on your PC or workstation.
2. Insert the supplied CD-ROM into the CD-ROM drive.
3. Select **RUN** from the **Start** menu.
4. At RUN, type <Drive>:\MAP\SETUP (where <Drive> is your CD-ROM) and click on the [**OK**] button.
5. Read the information on the MAP setup program screen.
   - ➔ Click on [**Cancel**] to quit setup and then close any programs you have running.
   - ➔ Click on [**Next**] to continue with the setup program.
6. Identify a path for the program. The path default is C: \Program Files\MAP. You can change the path or use the default. The installation begins.

3.3 Using the MAP Program

When you start MAP program from the Start menu, the program will automatically enters Microsoft Internet Explorer, Netscape Navigator, or your default browser and prompt you with a list of IPX print servers listed by their SAP identification and IP print servers by their IP addresses.

Click on the URL of the unit you want to configure to access the unit's HTTP Server. The program will setup a link to the print server and obtain HTML code describing the home page. Once the HTTP Server home page appears, you can configure or reconfigure your unit.

3.4 Configure the MAP Program

Once you install the program, you can Configure MAP to look for IP-based Printer Servers, IPX-based Print Servers and the maximum number of hops to serarch for IP-based Print Servers. The default hop count is 2.

The hop count number determines how many subnetworks the program will search to find units. An entry of 0 on the screen searches only the current subnet. An entry of 2 would search the wire directly connected to the workstation, and, all networks accessible through

two routers. Entries of 15 or higher will automatically search every connected network (this number is not recommended due to the amount of traffic it will generate).

Once the search parameters and a hop count is entered, click on OK.

3.5 Web IP Browser

Once you have assigned an IP address to your Network Interface Board, you may use an IP browser, such as Netscape, to access the HTTP Server and the HTML code allowing Network Interface Board monitoring and maintenance. To access the HTTP Server screens from your browser, do the following:

1. Open up your browser by clicking on its icon.

2. For the URL, type in the IP address of the Network Interface Board (ex. http://192.9.200.200). The HTTP Server screens should appear.
   If you have problems, check to make sure you are using the correct IP address.

Supplement for the Network Interface Board Type2000 Owner's Manual – Chapter 3

Chapter 3 - Using the Management Access Program or a Standard Web Browser, 3-5 Web IP Browser

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Do not use MAP to start up the Web IP Browser in a TCP/IP network environment. Instead, do the following.

1. Click [Start] on the task bar, and launch the WWW browser from the Program group.
2. In the [Address] box, input the IP address of your network interface board followed by "/nic" as follows:

   Example: http://133.139.162.67/nic

3. Press the Enter key on your computer keyboard.

   The "SNMP Printer Card" appears on your browser.

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Chapter 4
NetWare Configuration

Use this chapter if you will be printing from a Novell NetWare NOS. This chapter is divided into the following sections:

- Configuring NetWare 3.x describes how to configure the Network Interface Board for use with Version 3.x.
  Use PCONSOLE to set up the print server function.
- Configuring NetWare 4.x in Bindery Emulation describes how to configure the Network Interface Board for use with Version 4.x Bindery Services.
  Use PCONSOLE to set up the print server function.
- Configuring NetWare Directory Services describes how to configure the Network Interface Board for use with Version 4.x Directory Services.
  Use NetWare Administrator or PCONSOLE to set up the print server function.
- Network Interface Board Setup Parameters describes the parameters accessible via MAP or an IP Browser used to configure the Print Server for NetWare.
- Using NetWare Utilities explains how to use standard Novell NetWare utilities to make changes to the configuration of the Print Server function.
- NWSetup: NetWare and Print Server Configuration Program describes how to install the program and how to configure the Network Interface Board and NetWare file servers without using Novell NetWare utilities.

4.1 Configuring NetWare 3.x

Before configuring NetWare, you must determine if the Network Interface Board has its desired name. If you change the name, use MAP or an IP Browser to change the name.

The following steps are the general procedure for configuring the Network Interface Board. You must have supervisor privileges to do this configuration. These steps are covered in detail in the following paragraphs:

1. Start PCONSOLE and select the file server you want to use.
2. Create the print queues.
3. Specify the <print server> card as a print server.
4. Configure the print server and printer.
5. Assign the print queues.
6. Set up the NOTIFY options.
7. Repeat the procedure for other file servers.

When you are finished, turn the printer off and on again. The printer creates a status report that indicates the file servers to which the unit is attached and the queues which it services.

Before you begin:

- Verify that you have supervisor privileges on the file servers on which the Network Interface Board print server is to be entered.
- Verify that your version of PCONSOLE is later than 1.0.

4.1.1 Start PCONSOLE and Select File Server

Follow these steps to start PCONSOLE:

1. Log in to the network, type **PCONSOLE** and press the **ENTER** key.
2. Choose **Change Current File Server** from the **Available Options** menu. A list of file servers is displayed.
3. Select the file server on which you want to install the print server and press the **ENTER** key.
   If the name of the file server you want is not displayed, press the **INSERT** key to get a list of file servers.
4. Log in to the file server.
5. Press the **ESC** key to return to the Available Options menu.

4.1.2 Create Print Queues

The print server must be assigned to at least one print queue on the file server.

- If the print queue that you want the <print server> card to service already exists, and you know the name of this queue, go to 4.1.3 Enter the Print Server Name .
- If you do not know the name of the queue, or it does not exist, use the following procedure:

1. Choose **Print Queue Information** from the **Available Options** menu, and press the **ENTER** key. A list of existing queues is displayed.
2. To create a new queue, press **INSERT**. Enter the name of the queue and press the **ENTER** key. You do not need to enter any more information at this time.
3. Press the **ESC** key to return to the **Available Options** menu.

4.1.3 Enter the Print Server Name

A print server takes the print jobs from queues and sends them to the printer. Use this procedure to specify the name of the print server:

1. Choose **Print Server Information** from the **Available Options** menu, and press the **ENTER** key.

   A list of existing print servers is displayed.
2. Press the **INSERT** key.

   The New Print Server Name box is displayed.
3. Type the name of the print server into the entry box. The Novell print server name is printed under Novell NetWare information on the status sheet.

Note: *If desired, this name can be changed using MAP or Web Browser utilities.*

4. Press the **ENTER** key to add the print server name to the Print Servers list.

4.1.4 Configure the Print Server

1. Use the following procedures to configure the Print Server's function:

   Choose the print server name from the **Print Servers** list and press the **ENTER** key.

   The **Print Server** Information menu appears.

2. Choose **Print Server Configuration** from the menu and press the **ENTER** key.

3. Choose **Printer Configuration** from the menu and press the **ENTER** key.

   The **Configured Printers** menu appears.
   Since this is a new Print Server entry, all printers are labeled "Not Installed".

4. Choose the printer and press the **ENTER** key.

   The **Printer 0 Configuration** screen appears with a title of Printer 0.

5. If you choose to, change default in the Name field on this form to something that helps you identify the printer, for example, LASER_PRINTER. The print server uses this name in its message back to the users on the Notify list. Select **Name**, enter a name, and then press the **ENTER** key.

6. Select **Type** and press the **ENTER** key.

   A list of printer types is displayed.

7. Choose **Remote Other/Unknown** and press the **ENTER** key.

   This creates default entries in the other fields.
   These defaults are usually optimal, so do not change them without specific knowledge of the effects.

8. Press the **ESC** key.

   At the prompt, choose to save your changes.

9. Press the **ESC** key to return to the **Print Server Configuration** menu.

4.1.5 Assign Print Queues to the Printer

When you assign queues to the defined printer, you authorize the print server to service these queues.

Note: *Do not assign the same queue to two different print servers. If a queue is assigned to multiple print servers, print jobs may not go to the intended printer.*

---

1. Choose **Queues Serviced by Printer** from the Print Server Configuration menu.

2. Select the printer name from the list of defined printers.

3. Press the **ENTER** key to display the **Available Queues** list for the printer.

4. Select the queue you want and then assign a priority level from 1 to 10. It is recommended that you accept the default priority level.

5. Press the **ENTER** key.

   The queue appears on the list for the printer.

6. Press the **ENTER** key again to assign additional queues.

7. When you finish assigning queues, press the **ESC** key and then save your changes. Continue to press the **ESC** key to return to the Print Server Configuration menu. If you want to set Notify options, go to Section. 4.1.6. If you are finished, continue to press the **ESC** key and then save your changes.

4.1.6 Set Up Notify Options for the Printer (Optional)

To enable the print server to notify users or user groups if a problem occurs with the printer, set up the Notify options. The print server supports the enhanced NOTIFY options for printers, including informing users when the printer:

- Is the printer opened or off-line, paper jammed, or out of paper
- Requires a manual paper feed or a form change
- Has had an engine failure

1. Choose **Notify List for Printer** on the Print Server Configuration menu.
2. Select the printer from the **Defined Printers** list.

   The screen appears (which is blank for an initial installation).
3. Press the **ENTER** key to view a list of **Notify Candidates**.
4. Select the user or group from the list.
5. Set the **First** and **Next** intervals in the Notify Intervals screen.

   It is recommended that you use the defaults.

   ➔ The **First** interval is the number of seconds the network waits before it notifies candidates about a print job problem.

   ➔ The **Next** interval specifies how often in seconds candidates are notified. Enter a number for each interval and press the **ENTER** key.
6. Press the **ESC** key and then choose Save Changes. Press the **ESC** key at each screen until you reach the Print Server Configuration menu. If you have finished the configuration, press the **ESC** key and then save the changes.

4.1.7 Installing the Print Server on Multiple File Servers

To install the print server on more than one file server, perform the procedures described in Sections 4.1.1 through 4.1.6 for each file server. You must use the same name and password for the print server (or no password) on all file servers. You set the password for the Network Interface Board using the MAP program (⇨ refer to 4.3 Configuring the Network Interface Board in NetWare Directory Services). If you use a password, specify it on each file server using the **Change Password** option on the Print Server Information menu of the PCONSOLE utility.

When the Network Interface Board comes up, it automatically searches for and attaches to the file servers that are no more than four hops and have no more than eight ticks propagation delay. For extremely large or complex networks, this allows a bounded search time on start-up. If the print server must attach to file servers beyond this range, or, if you wish to accelerate start-up by eliminating the need to search all file servers in the four hops/eight ticks radius, the file servers with which the print server is to operate may be entered into the Print Server Configuration of a primary file server. The primary file server can be any file server within the four hops/eight ticks propagation time limits, but ideally is as close as possible to the print server. Once the print server locates the primary file server and

the list of file servers to be serviced, the automatic search is dropped and the print server will go directly to those file servers listed (and to no others).

4.1.8 Primary File Server

To use the primary file server option, use the following procedure on a file server close to the printer:

1. List the file servers to be serviced by the primary file server by **selecting File Server To Be Serviced** option from the **Print Server Configuration Menu**.
2. Press the INSERT key to display the **Available File Servers** list.
3. Select the name of each file server to be serviced and press the **ENTER** key to add it to the **File Servers To Be Serviced** list.
4. When the list is complete, press the **ESC** key to return to the menu.
5. Install the Network Interface Board on each of the primary file servers.

4.1.9 Preferred File Servers

The MAP or Web Browser utilities allow you to identify a preferred file server, to be identified within the Network Interface Board itself. If a preferred file server is listed, the Network Interface Board will attach to this identified file server instead of initiating the automatic search. If the preferred file server is also a primary file server (for example, has file servers listed under file servers to be serviced), the Network Interface Board will connect directly to these file servers.

Note: *The Preferred File Server is only applicable to bindery-based queues. Entering it has no affect on NDS queues.*

4.2 Configuring NetWare 4.x Bindery Emulation

Novell's NetWare 4.x can operate in two modes NetWare Directory Services (NDS) and Bindery Services Emulation. For Directory Services, ⇨ refer to 4.3 Configuring the Network Interface Board in NetWare Directory Services.
These services run simultaneously and transparently to each other. The Network Interface Board may be configured to operate with Bindery Services mode only (this section), or to operate under NDS (⇨ 4.3 Configuring the Network Interface Board in NetWare Directory Services). When configured under NDS, the Network Interface Board will also service older file servers operating in bindery mode.

Note: *If the Network Interface Board is not properly set up for NDS and the Bindery Services mode is not running, the Network Interface Board can not find its file servers, and the status page indicates the Novell NetWare protocol is not active.*

4.2.1 Confirm Bindery Context

Before installing the Network Interface Board on a Novell NetWare 4.x server in Bindery Emulation mode, check that the server has a Bindery Context (name for the server under Bindery Services mode). If the server does not have Bindery Context, it may be preferable to install in NDS mode. If the Network Interface Board must be installed in the Bindery Emulation

mode, the server must have Bindery Context. Perform the following steps to confirm the server has Bindery Context:

1. Go to the 4.x server and at the system console type: load install
2. Select **Maintenance/Selective Install** from the menu.
3. Select **NCF Files Options** from the menu.
4. Select **Edit AUTOEXEC.NCF** from the menu.
5. Search the file to see if you have a statement similar to the following included:

   ```
   SET BINDERY CONTEXT=0U=ENG
   ```

   Where **=0U=ENG** is an example of a name for the file server context. Use your own file server context in place of **=0U=ENG**.
6. At the console prompt, type the **SET BINDERY CONTEXT** statement that you entered in the **AUTOEXEC**.NCF file.

Note: *The command at the console prompt takes effect immediately. The definition in the file takes effect when the server is shut down and then restarted.*

4.2.2 Configure in Bindery Mode with PCONSOLE

Once you confirm the server has Bindery Context, use the following procedures to configure the Network Interface Board.

1. Log into the network as ADMIN.
2. Type **PCONSOLE** and press the **ENTER** key.

   The following screen appears.

Available Options
Print Queues
Printers
Print Drivers
Quick Setup
Change Context

3. When the **Available Options** menu appears, press the F4 key (for the Bindery Mode).

Note: *If you receive a message asking you to login to a server with Bindery connections, the server you are attached to does not have Bindery Mode enabled. Follow the procedures in 4.2.1. Confirm Bindery Context or log onto a server with Bindery Services activated.*

4. From the **Available Options** screen, select **Quick Setup** and press the **ENTER** key.
5. Use **Quick Setup** to connect your print server, print queue and printer correctly. You can modify these later if you need to.
6. Select **Print server** and press the **F8** key to modify the entry.
7. Enter the name of the **print server** in the Print server field and press the **ENTER** key.

Note: *The print server name is printed under the Novell Network Information on the Status and Configuration report. The factory default name is RDP_XXXXXX (XXXXXX is the serial number of the unit).*

8. Press the **ESC** key to move to the **New printer** field. Enter a name and press the **ENTER** key.
9. Press the **ESC** key to move to the **New printer queue** field. Enter a name and press the **ENTER** key.
10. Press the **ESC** key to move to the **Printer type** field and press the **ENTER** key. From the list of printer types, select **Other/Unknown** and press the **ENTER** key.
11. When you are finished, press the **F10** key to save the configuration.
12. Repeat steps 5 through 10 for each file server that the printer server services.
13. To view, add, delete, or modify print servers or queues after the initial setup, select either the **Print Queues** or **Print Servers** option on the **Available Options** screen.

4.3 Configuring the Network Interface Board in NetWare Directory Services

NetWare Directory Services (NDS) offers a different, more advanced approach to network management than previous NetWare versions. Generally, it stores and tracks all network objects. As a rule, all 4.x servers must have NDS loaded in order to function. In this way, every NetWare 4.x server is a Directory server, because it services named Directory objects such as printers, print servers and print queues. With the appropriate privileges, you can create a print server object, which, once configured in its context (or location) on the network, eliminates the cumbersome setup of print servers on every network server. NDS provides true enterprise networking based on a shared network database rather than a individually defined physical sites. The result is greatly improved print server setup and management.

The Directory Information Base (DIB) is used to store information about servers and services, users, printers, gateways, etc. It is a distributed database, allowing access to data anywhere on the network wherever it is stored. Pre-4.x NetWare versions provide the same data found in the DIB but the data is stored in the NetWare Bindery. The DIB was designed with more flexible access, more specific security, and, since it is distributed, it was designed to be partitioned. The Directory uses an object-oriented structure rather than the flat-file structure of the Bindery, and offers network-oriented access, rather than server-oriented access found in the Bindery.

The Directory is backward-compatible with the NetWare Bindery through Bindery emulation mode. Section 4.2 describes Print Server Operation with a 4.x NetWare system in bindery emulation mode. When Bindery emulation is enabled, Directory Services will accept Bindery requests and respond just as if a Bindery existed on the NetWare server being accessed. Be aware that information obtained from the Bindery query may not be stored in the server since the Directory is a partitioned and distributed database. Even though the NetWare 4.x server is not operating from a Bindery, the applications making Bindery requests will not know the difference.

You may use NetWare Administrator NWADMIN or PCONSOLE to configure the printer in NDS. Prior to printing, NDS must be set up as follows and the Network Interface Board must be set up with NDS Context and Tree. See Section 4.4. The steps below describe the use of

NWADMIN configuration to create printer, print server, and print queue objects. Then, you will assign, or associate those objects with each other.

If you wish to keep Bindery resources on any server, you can under NetWare 4.x if you declare a SET BINDERY CONTEXT statement in your AUTOEXEC.NCF file.

For those who prefer, NetWare does offer PCONSOLE as an alternative to NWADMIN. PCONSOLE can be used to set up static information about print servers such as: which queues to service, and whom to notify in the event of a problem. See Novell NetWare documentation for more information about the use of PCONSOLE for NDS.

4.3.1 Create Printer Object

1. Launch NetWare Administrator. The NetWare Administrator window will appear. To bring up your Directory Tree, open a Browser window by clicking on the Tools menu item and, the **Browse** item.

2. Highlight the Organizational Unit or Organization where you want to create the print service in the Directory Tree, select the **Object** item from the menu and choose **Create**.

   Note: *If you wish, you can create objects another way in NWADMIN by: selecting an Organizational Unit, clicking on the right mouse button (which produces a pop-up menu), and clicking on **Create...** use the left mouse button to bring up the **New Object** window). From this point, the procedure continues as described.*

3. When the **New Object** window appears, scroll down the **Class of New Object** icon list, select the Printer icon and click on the [**OK**] button.

4. When the **Create Printer** window appears, type a value in the **Printer Name** field and click on the [**Create**] button.

4.3.2 Create Print Server Object

1. Again, highlight the Organizational Unit, select the Object item from the menu and choose **Create**.

2. At the **New Object** window, scroll down the **Class of New Object** icon list, select the Print Server icon, and click on the [**OK**] button.

3. At the **Create Print Server** window, type a value in the **Print Server Name** field and click on the [**Create**] button.

4.3.3 Create Print Queue Object

1. Once again, highlight the Organizational Unit, select the **Object** item from the menu and choose **Create**.

2. At the **New Object** window, scroll down the **Class of New Object** icon list, select the Print Queue icon, and click on the [**OK**] button.

3. At the **Create Print Queue** screen, click on the **Directory Service Queue** button, then type in values for **Print Queue Name** and **Print Queue Volume** and click on the [Create] button. If you don't know the **Print Queue Volume** name (the hard drive you will be accessing), click on the icon to the right of the volume field. The Select Object window will appear with the volume listed in **Objects**. If the volume is not listed, scroll the **Directory Context** items until you find the volume where you want the queue to reside.

4. Click on the object (hard drive) of your choice and it will appear in the **Selected Object**: field. Click on the [**OK**] button.

5. The full volume will now appear in the Print Queue Volume field. Finally, click on the **[Create]** button.

4.3.4 Assign Printer Object

1. Go to the **Directory Tree**. Double click on the printer object just created and bring up the **Printer** window. See below. Find the **Assignments** button on the right-side of the window and click on the [**Add**] button.

2. When the **Select Object** window appears, find the print queue object just created among the choices listed in the **Objects** box and select it.

3. Click on the [**OK**] button and the print queue just created is added to **the Print Queues**: box in the Printer: window.

4. Click on the [**OK**] button again.

4.3.5 Assign Print Server Object

1. At the **Directory Tree**, double click on the print server object you just created and bring up the **Print Server** window.

2. At the **Print Server**: window, click on the [**Assignments**] button and [**Add**] button to bring up the **Select Object** window.

3. Select the printer object just created from the Objects: box and click on the [**OK**] button. Now the printer (with its context) appears in the Printers: box of the Print Server window. Click on the [**OK]** button.

4.3.6 Check Assignments

At the **Directory Tree**, double click on the **Print Queue** object you just created. At the Print Queue window, click on the [**Assignments**] button.

If you configured the print queue and printer correctly they will appear in the proper boxes on the **Print Queue** window. Press the [**Cancel**] button.

4.3.7 Set Up and Reset the Printer

NWADMIN configuration is complete. Before you can begin printing, though, be sure to set up and reset (power cycle) the printer.

4.4 Network Interface Board Configuration

The MAP utility or an IP Web Browser must be used to define the context and tree of the Print Server. It is also used to change the Print Server name, set a password, modify scan and frame search parameters, and set bindery-mode specific values.

Use the MAP utility or IP Web Browser (⇨ refer to Chapter 3) to access the Setup pages of the Network Interface Board. Once you have accessed the Network Administration pages or the Main Menu, do the following:

1. Select **Setup NetWare** under **Protocols**.
2. Click on **Enable NetWare**.

   If it is not selected, the NetWare protocols will not come up, the Network Interface Board will not appear as an advertised device, and the NIB will not be accessible using **IPX SNMP**.
3. The default name for the NetWare Print Server is RDP_123456, 123456 is the serial number of the Network Interface Board. This is also the name of the printer in peer-to-peer mode. If you want to change the default Print Server name, type this name in the **Print Server Name** space. Leave the space blank if the default name is to be used.
4. If you want the Network Interface Board login with a password, this password may be entered in the **Print Server Password** field, and again in the **Password Retype** field. If a password is used, this password must be the same password for all bindery-based and NDS-based Print Server entries.
5. Enter the name of a preferred bindery-based file server in **the Preferred File Server** field.

   The Preferred File Server entry is significant only for bindery or bindery emulation based operations. ⇨ Refer to 4.1.9 Preferred File Servers for the significance of a Preferred File Server. The Print Server must be configured on the preferred file server. Incorrect setup of a Preferred File Server can interfere with NetWare printing.
6. If the Print Server is to be operated under Novell Directory Services, type in a **Context** entry and **Preferred NDS Tree** entry in the appropriate fields. Be sure to give the whole context, whether typed or typeless, and do not begin your context path with a trailing period (.). If you don't know your tree, type: whoami at the DOS command line. A typed context name example is:

   `ou=standard.ou=organization_1`
7. In the default mode, the Print Server scans each queue which it is to service once per second. If you prefer a longer scan rate, you may enter the time between scans in seconds in the Print Queue Scan Rate field.
8. The Network Interface Board will normally monitor the network to determine which frame type is being used for Novell.

   When it recognizes a type, it will assume the same frame type. Once it selects a frame type, the Network Interface Board will only operate over that Novell frame type. Monitoring normally starts looking for IEEE 802.3, then Ethernet II, then 802.3 SNAP, etc. If your network is using multiple frame types for Novell, you should bias the frame search to the desired type by setting the button next to the designation under **Ethernet Frame Type**.
9. You can **Disable Bindery** mode on the Print Server if it is operating in NDS mode only. To do so, click on that box. If you disable Bindery, the Network Interface Board will not support Print Servers on a Bindery file server.
10. Once you have selected all desired settings and entered the desired NetWare information, you may cause this information to be entered in the Network Interface Board NV RAM by clicking on **Accept Settings**.

    As with all value changes, if you have not entered the Network Interface Board Management Password before, you must enter it in the appropriate space before clicking on **Accept Settings**.
11. Entered values do not take effect until the Network Interface Board is reset or power cycled. You may reset from MAP or the Web Browser by returning to the Home or Network Administration page, and click on **Reset** under **System**.

    Now click on Reset Unit. Alternatively, you may power cycle the printer. The new NetWare values should now be in effect.

4.5 Using the Novell PCONSOLE Utility

This section explains how to use the PCONSOLE utility to perform the following tasks:

- Attach and select a file server
- Select or delete queues for the print server
- Set-up the Notify function

See the NetWare Print Server Manual for detailed information on this utility.

Note: *You must have Supervisor privileges to perform many PCONSOLE operations.*

4.5.1 Changing the File Server

You can specify a file server as the current one.
To change the file server, use the following procedures:

1. Log into the current file server and start the PCONSOLE utility.
2. Select **Change Current File Server** from the **Available Options** menu.
3. Press the **INSERT** key to display the available file servers.
4. Select the file server you want as the current one and press the **ENTER** key.
5. Enter your username and press the **ENTER** key. If the username requires a password, the **Password** screen is displayed. Enter the password and press the **ENTER** key.
6. Select **Change Current File Server** from the **Available Options** menu. A list of the attached file servers is displayed.
7. Select the current file server from the **File Server/Username** screen.

4.5.2 Changing Print Queues

When you print a file, your system sends the file to a print queue. The print server assigned to that queue extracts the print job and sends it to the assigned printer. If a print server is servicing queues on multiple file servers, you must assign queues to the printer on each file server. To change the print queues, use the following procedures:

1. Start the **PCONSOLE** utility.
2. Select **Print Server Information** from the **Available Options** menu.
3. Select the print server from the list.
4. Select **Print Server Configuration** from the menu.
5. Select **Queues Serviced by Printer** from the menu.
6. Select a printer from the **Defined Printers** list.
7. Press **INSERT** at the **File Server/Queue/Priority** screen.

   The **Available Queues** list appears.
8. Select a queue from the list.

9. Press the **ENTER** key at the Priority screen to leave the priority setting at 1.
10. The highest priority queue is 1; 10 is the last. To change the priority of a queue, press the **ENTER** key at the **File Server/Queue/Priority** screen to display the **Priority** setting screen.
11. Press the back-arrow key to delete the current setting. Type a new number from 1 to 10 and press the **ENTER** key.
12. Repeat steps 7, 8, and 9 to assign additional queues to the printer.
13. Press the **ESC** key and save all changes.

4.5.3 How to Set Up Notify

You can specify users or groups of users that are notified if a problem occurs when a print job is sent to the printer. If the print server is servicing queues on multiple file servers, you must set up a NOTIFY list for each file server. To set up NOTIFY, use the following procedures:

Note: *The NIB supports the Notify function only in Bindery mode.*

1. Start the **PCONSOLE** utility.
2. Select **Print Server Information** from the **Available Options** menu.
3. Select the **print server** from the menu.
4. Select **Print Server Configuration** from the menu.
5. Select **Notify List for Printer** from the menu.
6. Select the printer from the **Defined Printers** menu.
7. Press the **ESC** key at the File Server/Notify Name/Notify Type/First/Next screen.

   The Notify Candidates screen appears.
8. Select the user or user group from the **Notify Candidates** screen.

   The Notify Intervals screen displays.
9. Set the **First** and **Next** intervals for notifying users about printer problems.

   ➔ The **First** interval is the number of seconds the network waits before it notifies users about a print job problem.

   ➔ The **Next** interval specifies how often in seconds users are notified. Enter a number for each interval and press the **ENTER** key.
10. Press the **ESC** key and save all changes.
11. Press the **ESC** key until you see the prompt to exit PCONSOLE.
12. Select **Yes** and then press the **ENTER** key.

4.6 NWSetup: NetWare and Print Server Configuration Program

NWSetup lets you do the entire setup procedure for Novell NetWare and your Network Interface Board using only one program. This program combines the following configuration steps:

- Lets you set up the Novell file servers and print servers for NetWare printing, instead of using NetWare utilities.
- Allows you to set up your print server printers for network printing.

4.6.1 How To Install

In order to install NWSetup, you must do the following:

1. Place the CD ROM into your CD drive.
2. Click on **CD ROM Table of Contents** when the menu appears.

   Note: *If you do not have Acrobat Reader 3.0x or higher installed, then you should click on "Install Acrobat Reader" first.*

3. Click on **Installation/Configuration Programs**.
4. Click on **NWSetup Software**.
5. Read the information screen. Click where indicated to start the installation.

4.6.2 How To Initiate NWSetup

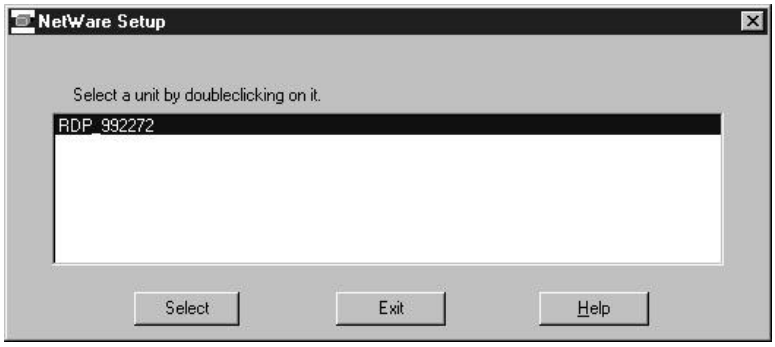
When you install NWSetup, a program icon is placed on your desktop. Click on the NWSetup icon to start the program.

Note: *If you are configuring for NDS (Directory Services), make sure you are logged into the correct tree and context before you initiate this program.*

4.6.3 Using the NWSetup Program

4.6.3.1 Select a Print Server

NWSetup displays a list of all Network Interface Boards available on your network after you initiate the program. The Network Interface Board appears with its serial number. See screen example below:

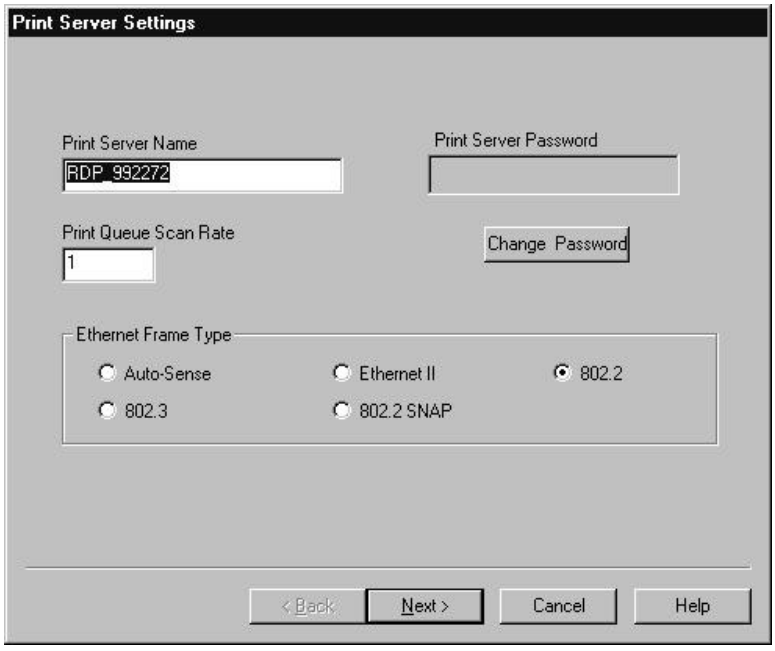


Once you select the Network Interface Board you want to configure, the Print Server Settings screen appears. This screen lets you set up your version of Novell NetWare for the Network Interface Board. See 4.6.3.2 Setup Novell NetWare.

4.6.3.2 Setup Novell NetWare

The Print Server Settings screens are shown below. There are two Print Server Settings screens, which you need to complete to configure the Network Interface Board for Novell NetWare.

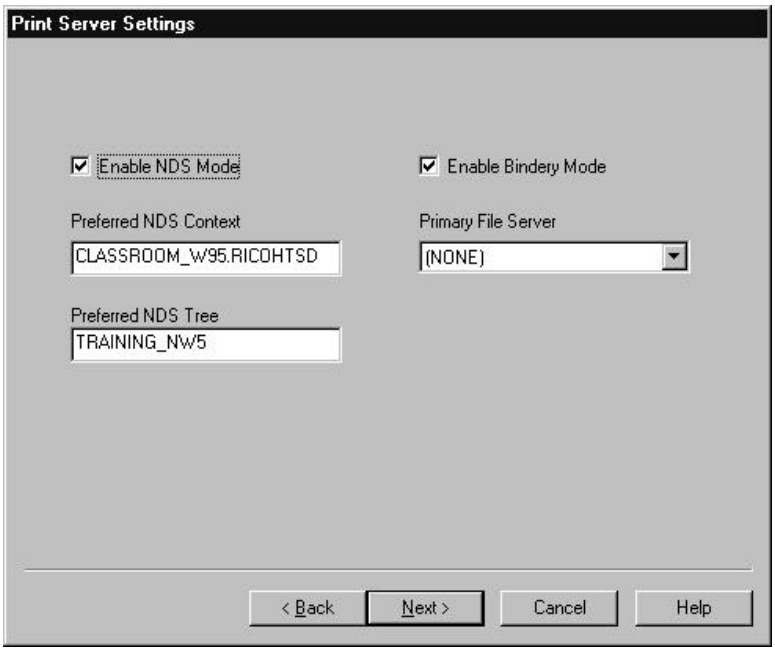
Each screen lets you set up your version of Novell NetWare for the Network Interface Board, including directory and bindery services. A description of the fields immediately follows each screen example.



Field	Description
Enable NetWare Print Server	Indicates whether the NetWare Network Interface Board has been enabled. • If the box is not checked, the Network Interface Board has not been enabled for NetWare. All other fields on the screen will be shaded. • If the box is checked, the Network Interface Board has been enabled for NetWare and you can make entries in the other fields.

Print Server Name	Indicates the NetWare print server name which the Network Interface Board uses to log into NetWare. You can enter a name which does not already exist in the network directory or server bindery. The maximum field length is 48 characters.
Print Queue Scan Rate	Specifies the rate at which a Network Interface board will poll print queues for a new print job. For example, if you place 1 in the field, the Network Interface Board should poll for new print jobs every 1 second. The minimum value for this field is 1 and the maximum is 250.
Print Server Password and Print Server Password Retype	Indicates the password for a Network Interface Board which will be used to log into NetWare. When you change this field, NWSetup will set the password in both NetWare and the Network Interface Board. The maximum length for this field is 32 characters. Both the Password and Password Retype fields must be identical before a user is allowed to Finish this screen.
Ethernet Frame Type	Indicates the Ethernet frame type that should be used by the NetWare protocol stack by default. Only one frame type can be selected.

Below is an example of the second Print Server Settings screen.



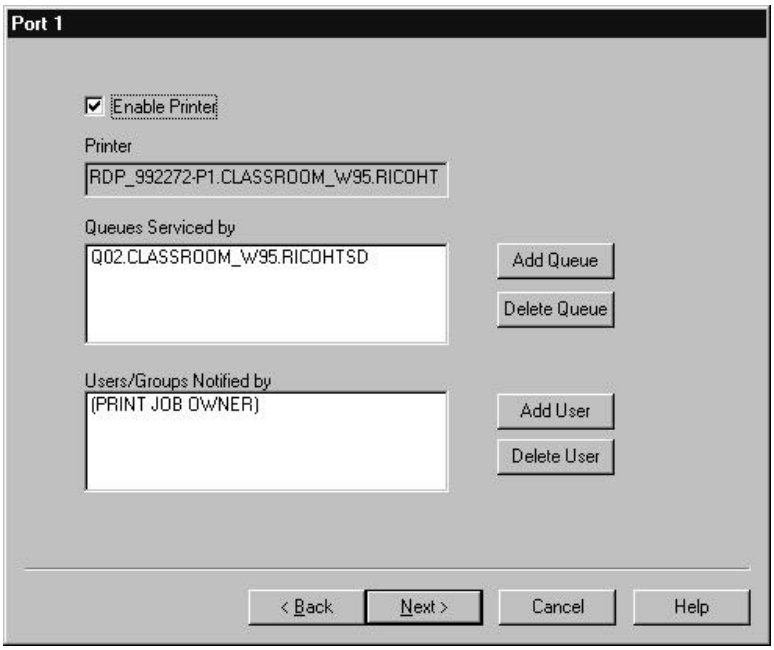
Field	Description
Enable NDS Mode	Indicates whether the Network Interface Board support Directory Services. When the box is checked, Directory Services is supported. If this box is not checked, then all other fields on this screen will not be enabled.
Preferred NDS Context	Enter a text string to set the NDS directory context for which the Network Interface Board will use to login to the network. The

	maximum field length is 128 characters. **NOTE:** *Make sure you enter the whole context, whether typed or typeless.*
Preferred NDS Tree	Enter a text string to set the NDS tree which the Network Interface Board will use to login. The maximum field length is 48 characters.
Enable Bindery Mode	Determines whether the Network Interface Board should attempt to service the NetWare newtork in bindery mode. If this box is checked, then Bindery Mode is enabled. **NOTE:** *If this field is not enabled, then the Primary File Server field will not be enabled.*
Primary File Server	Specifies which NetWare file server that the Network Interface Board should use as the primary file server. If no primary file server has been selected yet, or if a server that is not available is selected, then the first file server in the list is selected.

4.6.3.3 Print Server Settings

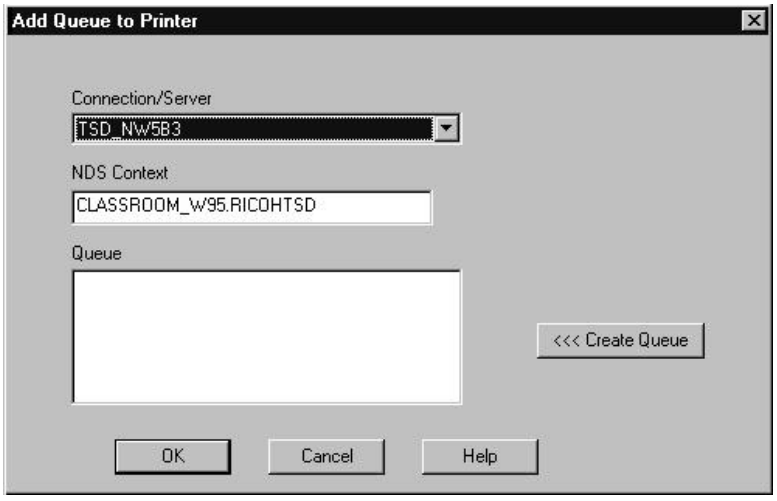
NWSetup lets you set up each Print Server printer. This information is usually entered using NetWare's NWADMIN or PCONSOLE utility. NWSetup eliminates the need for configuring your Network Interface Board printer through any NetWare utility.

The screen on the next page is used to set up a Print Server printer. A description of each field follows the screen example.

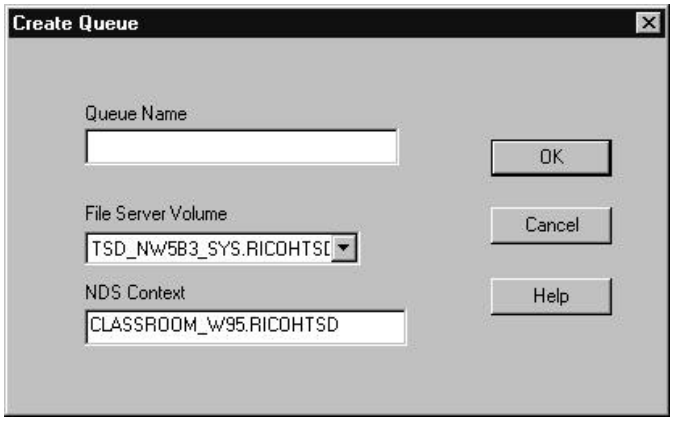


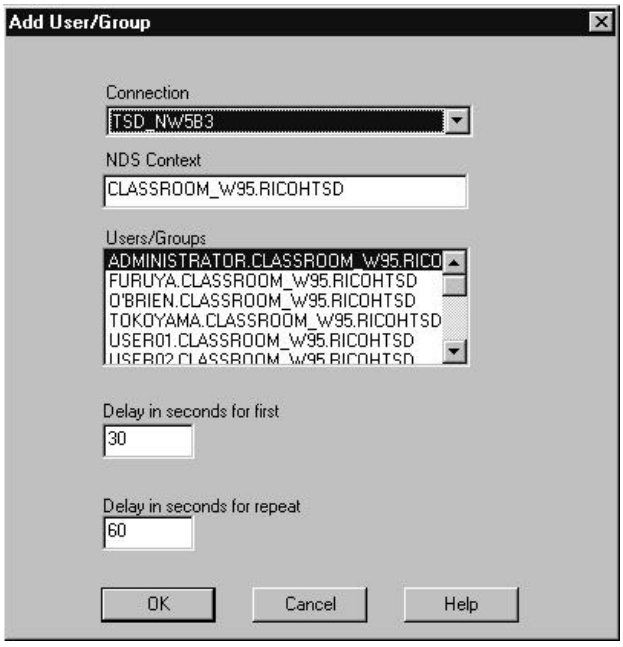
Field	Description
Enable Printer	Indicate whether support for the Network Interface Board and printer is enabled. • If this box is checked, then the printer is enabled.

	• If the box is not checked, then the printer is not enabled. The remaining fields on the screen will not be enabled.
Printer Name	Displays the name of the printer. This is a read-only field.
Queues Serviced by Printer	Lists all the queues which are to be serviced by the printer. • Queues associated with bindery connections are listed in the format bindery server name: queue name. • Queues associated with NDS connections are listed by their distinguished names. Example: If a printer services the queue YOURPTR_Q on the server OLD_SERVER which is a bindery server, then the queues would be listed as OLD_SERVER:YOURPTR_Q. If an NDS server has a distinguished name such as ENGINEERING.CORP and with a queue name ENGINGEERING_Q servicing the printer, then the queue would be listed as ENGINEERING_Q.ENGINEERING.CORP
Users/Groups Notified by Printer	Lists all users and user groups who will be notified when a printer error is detected. • Users and groups associated with bindery connections will be listed in the format bindery server name:user/group name. • Users and groups associated with NDS connections will be listed by their distinguished names. Example: If a user named Susan on the bindery server OLD_SERVER is listed on the printer's notify list, then the user would be listed as OLD_SERVER:SUSAN. If a user named Albert whose NDS context is ENGINEERING.CORP is on the printer's notify list, then the user would be listed as ALBERT.ENGINEERING.CORP • When you double click on an entry in this field, the Notify Settings screen appears. See Configuring the Notify Settings later in this section. *Note: The NIB supports the Notify function only in Bindery mode.*



Field	Description
Add Queue/ Delete Queue	Use the Add and/or Delete queue buttons to make changes. **Adding a Queue:** When the user clicks on the [Add Queue] button, a dialog box appears (see above) where the user can add a queue to the printer. Below is a description of each field: **Connection/Server**: Use to select a server connection. This list includes the NDS connection and all of the bindery file server connections which the user has. The NDS connection is always the first one listed, by default. When a new connection is selected, the Queue field is automatically updated. **NDS Context**: Specifies an NDS context for the queue. NWSetup lists all the queues within this context or the subcontexts in the Queue field. This field is only enabled when NDS support is enabled. By default, the NDS Context should be set to the preferred NDS context specified in the Print Server Settings screen. **Queue**: Lists all the queues available on the currently selected connection. · If an NDS connection is specified, then a list of all queue names in the selected context and, all subcontexts is displayed. · If you change the context in the NDS Context field, or, change the connection in the Connection/Server field, then the queue list is refreshed to reflect the new connection or context. · If you double click on a queue in the list, the queue is automatically added to the printer's service and you exit this screen. **Deleting a Queue:** Highlight the queue you want to delete and click on the [Delete Queue] button. A confirmation screen appears which asks if you really want to delete the highlighted queue. Press [Yes] to delete, or, [No] to cancel the deletion. **Note:** *If you delete a queue, you are not physically deleting the object from the file server. In order to delete the queue from a file server, you must use your NetWare utility to remove the queue from the file server queue list.*
Create Queue	When you click on the [<<<Create Queue] button on the Add Queue to Printer screen, the dialog box below appears:

	 Below is a description of each field: **Queue Name**: Enter the name of the new queue. This field must be completed in order to create a new queue. The maximum field length is 48 characters. **File Server Volume**: Indicates the volume on which the queue should be created. This field is enabled only if the current connection is an NDS connection. When enabled, it contains a list of all available volumes. For bindery services, the default volume name is SYS. **NDS Context**: Specifies the NDS context in which the queue is created. This field is enabled only when an NDS connection is being used. When this field first displays, it will list the NDS context specified in the Add Queue dialog. If you change it, NWSetup verifies that the new context exists on the directory tree. Click on OK to start the verification process.
Add User/Delete User	Press the [Add User] or [Delete User] buttons to add or remove Users/Groups for notification. **Adding Users/Groups:** When you press the [Add User] button, the following screen appears:



Connection: Select a connection from this field. This list includes the NDS connection and all of the bindery file servers connections which a user has access to. The NDS connection is always listed first, by default.

NDS Context. Specifies the NDS context to use when generating a list of users and/or groups. This field is enabled only for NDS connections. When first displayed, this field lists the preferred NDS context specified in the Print Server Settings screen. If you change this value, then NWSetup verifies that it is correct when the user attempts to move to another field or clicks on [OK].

Users/Groups: Lists all of the user and groups available on the currently selected connection. Any entry on this list can be added to a printer's service list. The list includes (Print job owner) which refers to the user who sent the job currently being printed.

- If an NDS connection is selected, NWSetup generates a list of all users and groups in the currently selected context and all subcontexts.
- When you double click on an entry in the list, the entry is added to the printer's service list.
- The user/group list is updated whenever the Connection or NDS Context fields are changed.

Delay in minutes for first message: Indicates how long the Network Interface Board should wait before sending a notification message that an error condition has been detected. The field is set to 5 minutes by default. Its minimum value is 1 minute and maximum value is 60 minutes.

Delay in minutes for repeat messages: Indicates how long the Network Interface Board should wait before sending a repeat notification of an error condition. This field is set to 30 minutes by default. Its minimum value is 1 minute and maximum value is 60 minutes.

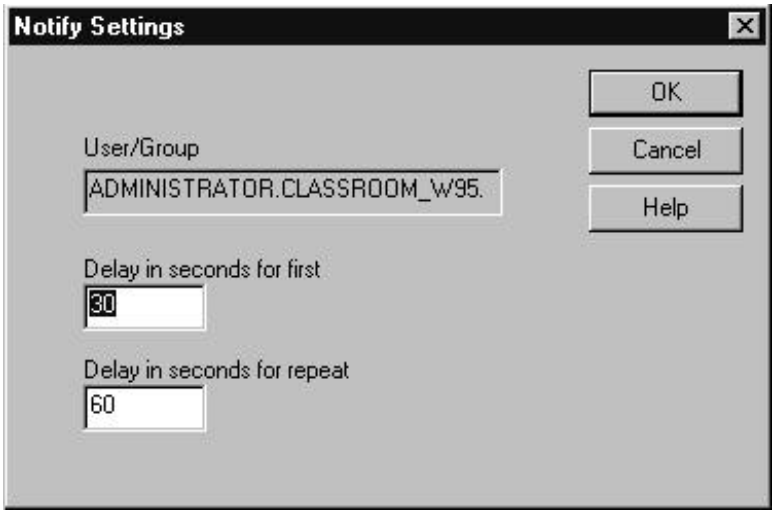
Note: The NIB supports the Notify function only in Bindery mode.

4.6.3.4 Configuring the Notify Settings

The Notify Settings screen appears when you double-click on an entry in the Users/ Groups Notified by Printer field on the Print Server screen. Use this screen to set up the notify function for the users or groups.

Note: *The NIB supports the Notify function only in Bindery mode.*

The following screen appears for setting up Notify. A description of each field follows the screen example.



Below is a description of each field:

Field	Description
User/Group name	Indicates the name of the user or group which is being edited. This field cannot be changed.
Delay in minutes for first message	Indicates how long the Network Interface Board should wait before sending a notification message to the user that an error condition has occurred. The field is set to 5 minutes by default but can be set to any value between 1 to 60 minutes.
Delay in minutes for repeat messages	Indicates how long the Network Interface Board should wait before sending a repeat notification message to a user or group when an error condition has occurred. The field is set to 30 minutes by default but can be set to any value between 1 to 60 minutes.

Chapter 5
Windows Peer-to-Peer Printing

5.1 Windows IPX Peer-to-Peer Printing

Windows Peer-to-Peer printing allows Windows-95/98 workstations and Windows NT 4.0 workstations and servers to print to Network Interface Board printers without an intervening file server and without using IP. The main features of the Windows IPX Peer-to-Peer printing are as follows:

- Runs on Windows 95/98 workstations and on Windows NT 4.0 workstations or servers "out of the box".
- Runs on networks which do not have a NetWare file server, as well as those that do.
- Implements IPX Peer-to-Peer bi-directional printing between Windows workstations and Network Interface Board printers.

5.1.1 Introduction and Preparation

The Peer-to-Peer implementation uses the IPX/SPX stacks for Windows 95/98 and Widows NT 4.0 that are provided by Microsoft and Novell. The redirector software provided will establish a connection with the printers supporting IPX Peer-to-Peer, without using an intermediate file server, whether or not your network uses Novell NetWare.

When configuring the network capabilities for the Windows computer, you must include the "**IPX/SPX Compatible Protocol**". If you are not using NetWare, you do not need to activate any NetWare Client application.

This inclusion of IPX/SPX can also be done after initial Windows installation by going to the Network setup function under Control Panel. To do this, you will need the Windows installation disk(s).

Note: *Because Peer-to-Peer uses the IPX/SPX Protocol, Novell operation must remain enabled on the Network Interface Board, even if traditional Novell printing facilities are not being used. The name of the Peer-to-Peer printer, as it appears in the Windows Port List, is the same as the Novell Print Server name, and may be changed by changing the Novell Print Server name using the Web-based management or MAP utilities.*

On power up, the Network Interface Board sniffs the network to see if there is Novell server activity. If there is, it will use the same frame type and the local network number that it senses. If, in addition, the NIB can log on to a file server, it will assume that Novell is normally used and will store this frame type and new number in NV RAM so that, when it comes up again, it will not have to spend the time sensing (which can take some time). However, if the NIB cannot attach to a file server, it will use the sensed values, but will not store them.

If the NIB does not see any Novell activity, it will use 802.2 on 802.3 as a frame type and will assign itself a network number of 0. The frame type and network number being used is reported on the status and configuration sheet.

If a NIB is being moved from a site that had active Novell to a site that does not, the unit should be reset to factory default to clear the frame type and network number information.

5.1.2 Installation and Operation

Install the Windows IPX Peer-to-Peer redirector as follows:

1. Put the CD-ROM which contains the redirector in your CD-ROM drive.
2. From the Windows main window, click on [**Start**].
3. Click on [**Run**].
4. From the Run screen, select the **Setup** file from the IPX-P2P directory in the CD-ROM that you placed in your CD-ROM drive.
5. Click on [**OK**].
6. At the IPX Peer-to-Peer Setup screen, click on [**Next**].

Note: *If setup detected a previous installation of the IPX Peer-to-Peer Redirector, it will prompt you to have Setup delete the old driver and continue the installation procedure. Click on [Yes] or [No].*

Once the redirector is installed, each printer on the network that supports this peer-to-peer capability will appear as a **Port** under Printer Properties.

To use the Peer-to-Peer connection, create a logical printer using the **Add Printer Wizard** according to the instructions for your printer. Set up the printer as a **LOCAL** printer. Use the driver that came with your printer.

When the Add Printer Wizard asks you to choose the Port, select the name of the Peer-to-Peer printer you wish to print to. (Example: RDP-xxxxxx) When you complete the installation, select the **Print Test Page** option.

5.2 Windows IP Peer-to-Peer Printing

For more detailed information on TCP/IP setup and printing, see Chapter 7.

Windows IP Peer-to-Peer printing allows Windows-95/98 workstations and Windows NT 4.0 workstations and servers to print to Network Interface Board printers without an intervening server and without using IPX. The main features of the Windows
IP Peer-to-Peer printing are as follows:

- Runs on Windows-95/98 workstations and on Windows NT 4.0 workstations or servers "out of the box".
- Implements IP peer-to-peer bi-directional printing between Windows workstations and Network Interface Board printers.

5.2.1 Introduction and Preparation

The Peer-to-Peer implementation uses the TCP/IP stacks that are provided with Windows 95/98 or Windows NT 4.0. The redirector software provided will establish a connection with the printers supporting Peer-to-Peer, using a direct IP connection over the network.

When configuring the network capabilities for the Windows computer, you must include the "**TCP/IP Protocol**". You do not need to activate any TCI/IP Client application.

This inclusion of TCP/IP can also be done after initial Windows installation by going to the Network setup function under Control Panel. To do this, you will need the Windows installation disk(s).

Note: *Because Peer-to-Peer uses the TCP/IP Protocol, TCP/IP operation must remain enabled on the Network Interface Board, and the Network Interface Board must be assigned a valid IP address. The name of the Peer-to-Peer printer, as it appears in the Windows Port List, is the same as the IP Address assigned to the Network Interface Board. The IP Address may be changed by changing the TCP/IP section using the Web-based management or MAP utilities.*

If a NIC is being moved from a site that had active TCP/IP to a site that does not, the unit should be reset to factory default to clear the IP Address and other network information.

5.2.2 Installation and Operation

Install the Windows IP Peer-to-Peer redirector as follows:

1. Put the CD-ROM which contains the redirector in your CD-ROM drive.
2. From the Windows main window, click on [**Start**].
3. Click on [**Run**].
4. From the Run screen, select the **Setup** file from the IP-P2P directory in the CD-ROM that you placed in your CD-ROM drive.
5. Click on [**OK**].
6. At the IP Peer-to-Peer Setup screen, click on [**Next**].

Note: *If setup detected a previous installation of the IP Peer-to-Peer Redirector, it will prompt you to have Setup delete the old driver and continue the installation procedure. Click on [**Yes**] or [**No**].*

Once the redirector is installed, each printer on the network that supports this peer-to-peer capability will appear as a **Port** under Printer Properties.

To use the Peer-to-Peer connection, create a logical printer using **the Add Printer Wizard** according to the instructions for your printer. Set up the printer as a **LOCAL** printer. Use the driver that came with your printer.

When the Add Printer Wizard asks you to choose the Port, select the name of the Peer-to-Peer printer (Example: xxx.xxx.xxx.xxx) you wish to print to. When you complete the installation, select the **Print Test Page** option.

Chapter 6
AppleTalk Configuration

Use this chapter if you will be printing from a Macintosh. This chapter explains how to configure the Network Interface Board using AppleTalk.

6.1 Choosing the Printer

To choose the printer, use the following procedure:

1. Make sure you have loaded the print driver and PPD file appropriate to your printer.
2. Make sure you have selected Ethernet as the AppleTalk connection.
3. Click on the Apple icon.
4. Select Chooser to display the Chooser screen.
5. Select the AppleTalk Zone containing the printer from the list at the lower left of the screen. Select the device driver type corresponding to your printer from those indicated at the upper left of the screen. A list of printers will appear in the display panel at the right of the screen.
6. From the display panel at the right of the screen, choose the name of the printer from the list of printers. The AppleTalk printer name for your printer is printed out on the Status and Configuration report under AppleTalk Connection Information.
7. The options available at this point depend on your printer driver. With a typical driver, you may select SETUP. Then select AUTO SETUP. There will be a series of messages as the Chooser communicates with the printer and locates the proper PPD. The setup screen will return, listing the PPD file selected. Select OK. Then exit from Chooser.

Chapter 7
TCP/IP Configuration

This chapter explains how to configure the Network Interface Board and your network for use with TCP/IP communication in various environments. Independent setup and installation procedures are provided for Windows systems and for most popular UNIX systems. The Network Interface Board TCP/IP capability will also operate with lpr spoolers on other systems, and with spooler/supervisor capabilities that communicate raw print jobs to the Print Server TCP/IP Port. The IP Peer-to-Peer redirector for Windows 95/98 and Windows NT systems, provided with the Network Interface Board, uses this TCP/IP port. The default port number is 10001, but may be changed to any desired number using the Telnet utility, SNMP, or the HTML pages accessible via MAP or a Web Browser. Section 7.5 Running Telnet, describes the interactive setup capability accessible through the Telnet utility on any TCP/IP platform, and is equally applicable to Windows, UNIX, and other TCP/IP environments. The use of MAP or a Web Browser to access HTML management pages in the Network Interface Board is described in Chapter 3.

7.1 Installation in a Windows Environment

The several versions and variations of Microsoft Windows may be used on a NetWare and/or TCP/IP networks, as well as in a native Microsoft Windows network. This flexibility allows various options for setting up the network printing system even though this Network Interface Board does not support NetBEUI. If the Windows workstations are connected to a NetWare 3.x or 4.x network, configure the printer interfaces for NetWare, and use standard Windows/NetWare utilities to provide access to the printer. If NetWare is not to be used, the users may access the printer using TCP/IP. Windows 95/98 and Windows NT 4.0 users can also use the Network Interface Board Peer-to-Peer capability as described in Chapter 5. The following sections describe installation using TCP/IP under Windows for Workgroups, Windows 95/98, and Windows NT.

7.1.1 Windows for Workgroups

Printing with TCP/IP requires that the workstation have TCP/IP capability and the corresponding spooler, lpr; or that the workstation can share an lpr queue on a Windows NT server (for example) that has one. In general, if printers are not shared, an lpr queue must be created on each workstation from which printing is initiated. See the Windows documentation about sharing printers.

Windows for Workgroups does not normally come with TCP/IP. However, a variety of TCP/IP facilities and third party lpr spoolers are available.

You will need the BOOTPL16.exe file if you wish to use the BOOTP Lite program to set up IP parameters. The BOOTPL16.exe file is provided with the Network Interface Board.

7.1.1.1 Installing TCP/IP

Follow the instructions for the TCP/IP package of your choice to set up the TCP/IP on the workstations.

7.1.1.2 Loading the lpr Spooler

Follow the instructions for the lpr spooler of your choice to set up the spooler on the workstations.

7.1.1.3 Setting up the Network Interface Board

The Network Interface Board must be given IP address and routing information to be used with TCP/IP. This can be done with either the ARP procedure or the BOOTP Lite program.

Prior to running these programs, install the Network Interface Board in your printer.

Power-up the printer. Keep the status sheet handy for the Ethernet (MAC) address. It should show that TCP/IP is enabled, but that the Protocol address is not configured. If the unit already has an IP address, these procedures will not work. However, you can use the “User Tools” menu on the operator panel of the printer, Telnet to the unit or use the HTML pages accessed by a Web Browser to change the IP parameters.

7.1.1.4 Assigning IP Address with ARP

The Network Interface Board must be on the same network segment as the workstation that you are using to configure it. The TCP/IP stack must be installed and operating.

Use the procedures in 7.1.1.5 Assigning IP Address with BOOTP Lite, if you prefer to use BOOTP Lite to configure the IP address instead of ARP:

1. From Windows, enter the MS/DOS box.
2. At the command prompt enter:

   `ping XXX.XXX.XXX.XXX`

   XXX.XXX.XXX.XXX: any valid IP address on your network - not the print server

   The identified unit should reply.

   `arp -s YYY.YYY.YYY.YYY 00-40-af-ZZ-ZZ-ZZ`

   YYY.YYY.YYY.YYY: IP address of Network Interface Board
   00-40-af-ZZ-ZZ-ZZ : MAC Address of Network Interface Board

   The entry should be accepted.

   `ping YYY.YYY.YYY.YYY`

   YYY.YYY.YYY.YYY: IP address of Network Interface Board

   Request should time out.
3. Recycle the power on the printer, or let the Network Interface Board reset itself. The Network Interface Board will produce a status page that should include the entered IP address.
4. When the Network Interface Board is up again, type the following at the command prompt:

   `ping YYY.YYY.YYY.YYY`

YYY.YYY.YYY.YYY: IP address of Network Interface Board

Continue until you get a reply.

Note: *This only enters the IP address; you must use the Telnet facility or the HTML pages accessed by a Web Browser to complete the IP setup for networks where subnets are used. See 7.6 Running Telnet, for instructions on how to enter the other IP parameters.*

7.1.1.5 Assigning IP Address with BOOTP Lite

This program uses the BOOTP protocol. The Network Interface Board must be on the same network segment as the workstation that you are using to configure it. The TCP/IP stack must be installed and operating. The BOOTP Lite program will not work in a Windows PC Operating as a DHCP Server.

The BOOTPL16.exe program will work with a 16 Bit TCP/IP stack.

1. Copy the BOOTPL16.exe file to the Windows directory of your workstation.
2. Reset the printer.

Note: *The Network Interface Board issues the BOOTP request for a finite period of time. The print server must be freshly reset for this program to work.*

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3. From Program Manager under File, select Run \windows\ BOOTPL16.exe.
4. Pull down the Admin menu to Configure option.
5. Enter the IP address that you want to assign to the Network Interface Board, its Subnet Mask (make sure it matches what you are using on your subnet), the Default Gateway (your router's IP address), and the MAC address of the Network Interface Board (Hardware Address, listed on the Status sheet as Ethernet Address). Use colons as delimiters as shown on the status sheet rather than the dashes that Windows uses.
6. Click on Go. You will get a message that the program is Verifying, and then it will tell you whether the unit is active or not.
7. Wait for about five minutes for the Network Interface Board to reset. The Status sheet should report the newly entered IP information.
8. Enter the MS/DOS box. At the command prompt enter:

   `ping YYY.YYY.YYY.YYY`

   YYY.YYY.YYY.YYY: IP address of Network Interface Board

   Continue until you get a reply.

If it does not respond, verify that TCP/IP is enabled on the status sheet. If the status sheet does not show the IP information, then repeat the above procedures.

7.1.1.6 Setting up IP and lpr Parameters

The Network Interface Board provides for a setup connection via the standard Telnet port. To be able to make changes to a unit with factory default settings, you must logon as "**sysadm**". The default password is also "**sysadm**" (This password can be changed from the Telnet utility). Section 7.6 Running Telnet, describes the use of the Telnet utility.

1. Telnet to the Network Interface Board (the login and password are both "**sysadm**").

2. Turn off the protocols that you are not utilizing (option 3).

3. Setup the subnet mask and default gateway for the Network Interface Board if applicable (menu option 1). (If you used BOOTP, this will already have been done).

4. Exit, Save and Reset the Network Interface Board.

You can also use the “User Tools” menu on the operator panel, the HTML pages accessible via a Web Browser to setup lpr. The password to change parameters with the HTML pages is the same as the Telnet password.

7.1.1.7 Creating an lpr Queue on the Workstation

Follow the instructions for the lpr spooler of your choice to set up the lpr queue on the workstations. Enter **PORT1** for the Remote Printer Name.

Note: *PORT1 must be entered in capital letters.*

7.1.2 Microsoft Windows 95/98

Windows 95/98 comes with a TCP/IP stack. To print with this protocol, a client also requires an lpr utility. This program is available from various sources. The lpr queue can be created on each workstation or the lpr queue can be created on one workstation and shared on the network. Windows 95/98 workstations can also share a lpr printer installed on an Windows NT server on the network.

If you wish to use the Bootp Lite program, you will also need the **BOOTPL32.exe** provided with this Network Interface Board on the MAP directory of the CD-ROM.

7.1.2.1 Loading the lpr Spooler

Follow the instructions for the lpr spooler of your choice to set up the spooler on the workstations.

7.1.2.2 Setting up the Network Interface Board

The Network Interface Board must be given IP address and routing information to be used with TCP/IP. This can be done with MAP utility. Follow the instructions for MAP, which is documented elsewhere. If you cannot use MAP, you can use either the ARP procedure, or the BOOTPL32 program.

Power-up the printer. Keep the status sheet handy for the Ethernet (MAC) address. It should show that TCP/IP is enabled but that the Protocol address is not configured.

If the unit already has an IP address, these procedures will not work. However, you can use “User Tools” menu on the operator panel, Telnet or the HTML pages accessed by MAP or Web Browser to change the IP parameters.

7.1.2.3 Assigning IP Address with ARP

The Network Interface Board must be on the same network segment as the workstation that you are using to configure it. The TCP/IP protocol stack must be installed and operating.

You can use BOOTPL32 to configure the IP address instead of ARP.

1. From Windows, enter the MS/DOS box. At the command prompt enter:

```
ping XXX.XXX.XXX.XXX
```

XXX.XXX.XXX.XXX: any valid IP address on your network - not the print server

The identified unit should reply.

```
arp -s YYY.YYY.YYY.YYY 00-40-af-ZZ-ZZ-ZZ
```

YYY.YYY.YYY.YYY: IP address of the Network Interface Board
00-40-af-ZZ-ZZ-ZZ: MAC Address of the Network Interface Board

The entry should be accepted

```
ping YYY.YYY.YYY.YYY
```

YYY.YYY.YYY.YYY: IP address of the Networ**k** Interface Board

Request should time out.

2. Recycle the power on the printer, or let the Network Interface Board reset itself.

   The Network Interface Board will produce a status page that should include the entered IP address.

3. When the Network Interface Board is up again, at the command prompt, enter:

   ```
   ping YYY.YYY.YYY.YYY
   ```

   YYY.YYY.YYY.YYY: IP address of the Networ**k** Interface Board

   Continue until you get a reply.

Note: *This only enters the IP address. You must use the Telnet facility, (Section 7. 6 Running Telnet,) to enter the other IP parameters.*

7.1.2.4 Assigning IP Address with BOOTPL32

You may provide the IP address and other IP parameters to the Network Interface Board on 32 Bit TCP/IP Stack (Windows NT & Windows 95/98) using the BOOTPL32.exe program. You will have to store the BOOTPL32.exe file in the Windows directory. The BOOTPL32.exe program will not work if the Windows PC is an active DHCP Server.

This program uses the BOOTP protocol. The Network Interface Board must be on the same network segment as the workstation that you are using to configure it. The TCP/IP stack must be installed and operating.

1. Reset the printer.

   Note: *The Network Interface Board issues the BOOTP request for a finite period of time. The print server must be freshly reset for this program to work.*

   ---

2. Double-click on the **BOOTPL32** icon to start the program.

3. Pull down the **Admin** menu to **Configure** option.

4. Enter the IP address that you want to assign to the Network Interface Board, its Subnet Mask (make sure it matches what you are using on your subnet), Default Gateway (your router's IP address), and the MAC address of the Network Interface Board (Hardware Address, listed on the Status sheet as Ethernet Address). Use colons as delimiters as shown on the status sheet rather than the dashes Windows uses. (eg. 00:40:AF:12:34:23)

5. Click on **[Go]**.

6. Wait about five minutes. The Network Interface Board should recycle and produce a status sheet showing the IP parameters you have just entered.

7. Pull down **Admin** menu to **Verify**. You should get a message back stating that the Unit is Active. If you do not get this message, verify that TCP/IP is enabled on the status sheet.

8. When you get a response that your unit is active, you should be able to ping and Telnet to the Network Interface Board.

7.1.2.5 Setting up IP and lpr Parameters

The Network Interface Board provides for a setup connection via the standard Telnet port. To be able to make changes to a unit at factory default settings, you must logon as sysadm. The default password is also "**sysadm**". (This password can be changed from the Telnet utility.) See 7.6 Running Telnet, for instructions on using Telnet.

1. Telnet to the Network Interface Board (the login and password are both "**sysadm**").

2. Turn off the protocols that you are not utilizing (option 3).

3. Setup the subnet mask and default gateway for the Network Interface Board if applicable (option 1).

4. Exit, Save, and Reset the Network Interface Board.

You can also use the HTML pages accessible via MAP or a Web Browser to set up lpr. The password to change parameters with the HTML pages is the same as the Telnet password.

7.1.2.6 Setting up lpr on the Workstation

Follow the instructions for the lpr spooler of your choice to set up the lpr queue on the workstations. Enter PORT1 for the Remote Printer Name.

Note: *PORT1 must be entered in capital letters.*

7.1.3 Windows NT Instructions

Windows NT (version 3.5 or higher) does come with TCP/IP and lpr capabilities, although these must be installed when the unit is configured. You must install the TCP/IP Protocol, Simple TCP/IP Services, and Microsoft TCP/IP Printing prior to entering the network printer on the workstation.

Note: *Once you have lpr installed on a Windows NT workstation and have allowed printer sharing, other workstations may use the printer through the Microsoft Windows Network without having to have separate lpr queues installed on each workstation. If you wish to use BOOTPL32, you will need the BOOTPL32.exe file. This file is on the MAP directory of the CD-ROM supplied with the Network Interface Board.*

7.1.3.1 Setting Up the Network Interface Board

The Network Interface Board must be given an IP address and routing information to be used with TCP/IP. This can be done with either the ARP procedure or the BOOTPL32 program.

Power-up the printer. Keep the status sheet handy for the Ethernet (MAC) address. It should show that TCP/IP is enabled but that the Protocol address is not configured.

If the unit already has an IP address, these procedures will not work. However, you can TELNET to the unit to change the IP parameters.

7.1.3.2 Assigning IP Address with ARP

The Network Interface Board must be on the same network segment as the workstation that you are using to configure it. The TCP/IP stack must be installed and operating.

You can use BOOTPL32 to configure the IP address instead of ARP.

1. From Windows, enter the MS/DOS box. At the command prompt enter:

   `ping XXX.XXX.XXX.XXX`

   XXX.XXX.XXX.XXX: any valid IP address on your network - not the print server

   The identified unit should reply

   `arp -s YYY.YYY.YYY.YYY 00-40-af-ZZ-ZZ-ZZ`

   YYY.YYY.YYY.YYY: IP address of the Network Interface Board
   00-40-af-ZZ-ZZ-ZZ: MAC Address of the Network Interface Board

   The entry should be accepted.

   `ping YYY.YYY.YYY.YYY`

   YYY.YYY.YYY.YYY: IP address of the Network Interface Board

   Request should time out.

2. Recycle the power on the printer or let the Network Interface Board reset itself. The Network Interface Board will produce a status page that should include the entered IP address.

3. When the Network Interface Board is up again, at the command prompt, enter:

   `ping YYY.YYY.YYY.YYY`

   YYY.YYY.YYY.YYY: IP address of the Network Interface Board

   Continue until you get a reply.

Note: *This only enters the IP address; you must use the Telnet facility or the HTML pages accessed by MAP or Web Browser facility to enter the other IP parameters.*

7.1.3.3 Assigning IP Address with BOOTPL32

You may provide the IP address and other IP parameters to the Network Interface Board on 32 Bit TCP/IP Stack (Windows NT & Windows 95/98) using the BOOTPL32.exe program.

This program uses the BOOTP protocol. The Network Interface Board must be on the same network segment as the workstation that you are using to configure it. The TCP/IP stack must be installed and operating.

This NT system cannot be operating as an active DHCP Server.

1. Reset the Network Interface Board.

   Note: *The Network Interface Board issues the BOOTP request for a finite period of time. The print server must be freshly reset for this program to work.*

2. Double-click on the **BOOTPL32** icon to start the program.

3. Pull down the **Admin** menu to **Configure** option.

4. Enter the IP address that you want to assign to the Network Interface Board, its Subnet Mask (make sure it matches what you are using on your subnet), Default Gateway (your router's IP address), and the MAC address of the Network Interface Board (Hardware Address, listed on the Status sheet as Ethernet Address). Use colons as delimiters as shown on the status sheet rather than the dashes that Windows uses. (eg. 00:40:AF:12:34:23)

5. Click on **[Go]**.

6. Wait about five minutes. The Network Interface Board should recycle and produce a status sheet showing the IP parameters you have just entered.

7. Pull down **Admin** menu to **Verify**. You should get a message back stating that the Unit is Active. If you do not get this message, check that TCP/IP is enabled on the status sheet.

8. When you get a response that your unit is active, you should be able to ping and Telnet to the Network Interface Board.

7.1.3.4 Setting up IP and lpr Parameters

The Network Interface Board provides for a setup connection via the standard Telnet port. To be able to make changes to a unit at factory default settings, you must logon as sysadm. The default password is also "**sysadm**" (this password can be changed from the Telnet utility). See 7.6 Running Telnet, for instructions on using Telnet.

1. Telnet to the Network Interface Board (the login and password are both "sysadm").

2. Turn off the protocols that you are not utilizing (option 3).

3. Setup the subnet mask and default gateway for the Network Interface Board if applicable (option 1).

4. Exit, Save, and Reset the Network Interface Board.

You can also use “User Tools” menu on the operator panel, the HTML pages accessible via MAP or a Web Browser to set up lpr. The password to change parameters with the HTML pages is the same as the Telnet password.

7.1.3.5 Setting up lpr on the Workstation

The following procedure is used to set up the lpr spooler on the Windows NT server.

1. Open **Control Panel**.

2. Go to **Printers**.

3. Choose **Printer Menu**.

4. Choose **Create Printer**.

5. Enter a **printer name** (For example, lprprinter).

6. Select the proper **printer driver**.

7. Enter a description.

   This is optional.

8. In the **Print To** dialog, choose **Other**.

9. In Print Destinations window, **select lpr port**.

This leaves you with add lpr compatible printer window.

10. Line 1: Address of host providing lpd (Print server); enter **IP address**.
11. Line 2: Name of printer on that machine - enter **PORT1** (the word PORT MUST be in uppercase).
12. Choose [**OK**] to exit.

Your Network Interface Board is now configured to operate Windows NT. You may print from any application by following the normal print instructions for that application.

7.2 Dynamic Host Configuration Protocol

DHCP is a service much like BootP that provides a method for assignment and maintenance of IP addresses. The Network Interface Board is able to obtain IP information from this service.

There are two user selectable parameters related to the DHCP function. These are accessible in the TCP section of Network Administration, in the HTML pages.

1. Enable DHCP; and
2. IP Address in NVRAM

   ➔ If DHCP is not enabled, the Network Interface Board will make no DHCP requests under any circumstances. If the Network Interface Board does not have an IP address stored, or if "IP Address in NVRAM" is OFF, the Network Interface Board will issue BOOTP requests, etc,

   ➔ If DHCP is enabled, the Network Interface Board will make DHCP requests when the Network Interface Board is reset or on power up, when the Network Interface Board does not have an IP address stored, or when " IP Address in NVRAM" is OFF. These DHCP requests will be in addition to BOOTP requests.

   ➔ If DHCP is enabled, and the Network Interface Board had an IP address in NVRAM, and "IP Address in NVRAM" is ON, then the Network Interface Board will use the IP information from NVRAM and there will be no DHCP activity on the part of the Network Interface Board.

The factory default is with both Enable DHCP - ON and IP Address in NVRAM - ON. In this case, the Network Interface Board will issue DHCP requests if it does not already have IP identification information stored in its NV RAM.

Important: *If DHCP and the Network Interface Board is in the default mode, you must establish a permanent lease or reservation for the Network Interface Board in the DHCP server. Failure to do this may cause the same address to be given out to another host.*

7.3 IP Peer to Peer Printing

This section explains how to setup and use IP Peer-to-Peer Printing. This allows you to set up your print server ports for peer to peer printing for IP, Windows NT4.0 , and Windows 95/98.

7.3.1 How to Install

Place the CD-ROM into a CD-ROM drive.

1. In Windows 95/98, go to START and then RUN.
2. Run the SETUP.EXE program in the IP-P2P directory on the CD-ROM and click on OK when done.
3. Follow the program prompts.

7.3.2 Peer-To-Peer IP Setup

IP Peer-to-Peer printing allows you to print to a network printer for networks without a file server or for networks where you do not want to use the server for printing. Use Peer-to-Peer printing on Windows NT (4.0), and Windows 95/98 systems. Double-click P2P-IP.exe in C:\P2P-IP folder (default) to bring up the Peer-to-Peer printing setup screen. An explanation for each field on the screen is described below.

Max Hops for Search. Once you install the program, you can setup Peer-To-Peer IP with the hop count. The default hop count is 2. The hop count number determines how many networks the program will search to find units. An entry of 0 on the screen searches only the network wire directly connected to the workstation. An entry of 2 would search the wire directly connected to the workstation, and, all networks accessible through two routers. Entries of 15 or higher will automatically search every connected network (this number is not recommended due to the network traffic it would generate).

IP Port Base The starting port number for the print server. The default is 10000 (corresponding to a TCP/IP port of 10001) but you can change it if you need to.

Printer Names. Lets you select how you can view the printer names in the Windows port list.

Based on Serial Number - uses the printer server serial number to identify the printer names. For example, if 991354 is the serial number of the unit, SN_991354-1 would be the printer port.

Based on IP Address - use the IP address to identify the printer names. For example, if 199.99.92.99 is the IP address for the unit, 199.99.92.99-1 would be the printer port.

Based on DNS (Domain Name Server) - uses the DNS name to identify the printer name. For example, <PTR-MKTG.DOMAIN.COM>.

7.3.3 Add Printers for IP Peer To Peer Printing

You can add printers manually whenever you cannot find printers automatically because of router setup or the hop count setting. In general, this should not be necessary.

Step 1: Use P2P-IP to Add Printers

1. Click on the **P2P-IP** menu item in Windows. The Peer-to-Peer IP Setup screen appears.
2. Press the [**Printer...**] button; a new form screen appears.
3. Enter information for the printer in all the fields described on the form.

Field	Description
IP Address	Enter the IP address of the printer you want to add.

Name	Assign a name to the printer. You can enter any name which you feel identifies the printer.
Port Number	The port number of the printer. The default is 10001.
Description	Use this field to describe the printer location or the users who will access the printer.

4. When you have entered all the information, click on the **Add** button. The printer is listed in the **Available Printers** field at the bottom of the screen.

5. Click on [OK] when you have finished adding all the printers you want to add.

Step 2 Use the Add Printers option in Windows (Unset Settings/Printers).

1. Click on the [Add Printer] button.

2. Select Local Printer from the menu.

3. Select the make and model of the printer you want to use.

   A list of printer ports appears. IP peer-to-peer printers will appear in this list.

4. Select the IP printer you want to use.

5. Complete the remainder of the printer setup procedure as you would normally.

7.4 UNIX Printing

The Network Interface Board can support UNIX TCP/IP printing in two modes:

- Host-based lpd where a supplied line printer daemon is run on one or more workstations and print data is communicated to the Network Interface Board via a TCP/IP port or,
- Printer-based lpd where the printer appears as a host running a line printer daemon.

In general, printer-based lpd is easiest to use on BSD UNIX systems, requiring an entry in the printcap file once the Network Interface Board has its IP information. Some UNIX System V systems have restrictions on support of remote lpr/lpd printers, requiring that the host-based lpr/lpd approach be used. For many operating systems, you have the option of using host-resident printing or print server-resident printing. Each mode has certain advantages.

- The host-resident method can print the username and filename on its banner page; the print server-resident method prints a banner page with the host's name.
- The print server-resident method requires you to configure the printer only one time, when you install the print server. The host-resident method requires that a printing daemon be installed on every host that you want to be able to print jobs.

Note: *The Network Interface Board will also operate with other host-resident print supervisor/spooler programs that present a print image to the printer over a TCP/IP port. The base TCP/IP port number can be changed via Telnet, or the Network Interface Board HTML setup pages accessed by MAP or a Web Browser. Remember, the actual port is always one higher than the base port number. The Status and Configuration page indicates the actual port number.*

7.4.1 Configuring the IP Address on the Network Interface Board

The Network Interface Board must be given IP address and routing parameters. You can configure the IP address for the Network Interface Board in one of the following ways:

- Use MAP, as described in Chapter 3.
- Use the Internet Boot Protocol (BOOTP).
- Use reverse ARP (rarp, Ethernet II frame type only).
- Use arp and ping.

For each method, you will need to provide the Ethernet address of the Network Interface Board. The Ethernet address is the 12-character code that is printed under Network Address on the configuration status report each time the printer is turned on.

You can use the BOOTP, rarp, or ping procedures only when the Print Server is in its factory default state (no IP information entered.) After the Print Server has an IP address, you must use the Telnet utility, the AppleTalk NIManage utility for the Macintosh, or the Network Interface Board HTML management pages accessed through the MAP utility or a Web Browser to change an IP address, Subnet Mask and Default Gateway.

7.4.1.1 Using BOOTP

The BOOTP daemon is a native TCP/IP option for configuring the IP address of a diskless network device. To communicate the IP address, use the following procedure:

1. Turn off the printer.
2. Log in as superuser on a host on the same subnet as the print server. However, if the server resides on another subnet, complete this procedure to store the IP address in the print server. Reconnect the print server anywhere on the network, and then use Telnet or the HTML pages accessed by MAP or a Web Browser utility to change the IP address. See 7.5 Running Telnet, for instructions on using Telnet.
3. Find the Ethernet address of the Network Interface Board. The address is printed on the configuration status report each time you turn the printer on.
4. Edit the hosts file (usually /etc/hosts) or use NIS or DIS to add the IP address and Network Interface Board's node name. See the network administrator for the IP address. For example, a Network Interface Board named printfast with an IP address of 192.9.200.200 has the following entry:

   ```
   192.9.200.200 printfast
   ```

5. Stop the BOOTP daemon if it is running.
6. Edit the /etc/BOOTP tab file and add the following information:

   ```
   nic_host:\
   :ht = hardware type:\
   :ha = ethernet address:\
   :ip = IP address:\
   :sm = subnet mask:\
   :gw = gateway address:
   ```

   For example, for an RFC 1048 system:

```
printfast:\
:ht = ether:\
:ha = 0040AF03AF6E:\
:ip = 192.9.200.200:\
:sm = 255.0.0.0:\
:gw = 192.9.200.10:\
```

If running with a more recent BOOTP implementation, such as with SCO UNIX, add:

```
:vm = rfc1048:
```

Note: *The :ht = ether command should always be used.*

The same information uses the following format on an RFC 951 "RFC 951" system:

Host	htype	Haddr	iaddr	bootfile
Printfast	1	00:40:af:03:af:6e	192.9.200.200	defaultboot

7. Start the BOOTP daemon by typing:

   ```
   bootpd -s
   ```

8. Check the printer to verify that the Network Interface Board is connected to the network. Turn on the printer.

9. Wait until the printer powers up and finishes initializing to allow enough time for the IP address to become known and to be saved in non-volatile memory. The Network Interface Board should reinitialize itself.

10. After the Network Interface Board has reinitialize, send a ping command to verify that the print server obtained its IP address. For example:

    ```
    ping 192.9.200.200
    ```

    If the print server has the address, the result is a confirmation message:

    ```
    192.9.200.200 is alive
    ```

11. Remove, or comment out, your changes to the /etc/BOOTP tab file.

12. Stop the BOOTP daemon and, if you want it to run, restart it.

7.4.1.2 Using rarp

The Reverse Address Resolution Protocol (rarp) allows network devices to query a server for their IP addresses on start-up. For this procedure, there needs to be a workstation with a rarp server. To store the IP address, use the following procedure:

1. Turn off the printer.

2. Log in as superuser on the rarp server. However, if the server resides on another subnet, complete this procedure to store the IP address in the print server. Reconnect the print server anywhere on the network, and then use the Telnet or the HTML pages accessed

by MAP or a Web Browser to adjust the IP parameters for the subnet on which the Network Interface Board is to operate.

3. Find the Ethernet address of the Network Interface Board. The address is printed on the configuration status report when you power on the printer.

4. Edit the hosts file (usually /etc/hosts) or use NIS or DIS to add the IP Address and Network Interface Board's node name. See the network administrator for the IP address. For example, a print server with the name of printfast has the following entry:

   ```
   192.9.200.200  printfast
   ```

5. Edit the /etc/ethers file or use NIS or DIS to add the Ethernet address. To continue the example, for the printfast card with an Ethernet address of 00:40:c8:00:00:ff, make the following entry:

   ```
   0:40:c8:0:0:ff printfast
   ```

6. If the rarp daemon is running, stop it and restart it. Verify that the daemon is running.

7. Check the printer to see that the print server is connected to the network. Turn on the printer.

8. Wait until the printer powers up and finishes initializing to allow enough time for the IP address to become known and to be saved in non-volatile memory. The Network Interface Board should then reset itself.

9. After the Network Interface Board has reset, send a ping command to verify that the print server obtained its IP address. For example:

   ```
   ping 192.9.200.200
   ```

   If the print server has the address, the result is a confirmation message:

   ```
   192.9.200.200 is alive
   ```

10. Remove, or comment out, your changes to the /etc/ethers file.

11. Stop the rarp daemon and, if you want it to run, restart it.

7.4.1.3 Using ping

Use the following procedure to enter the IP Address:

1. Turn off the printer.

2. Log in as superuser on a host on the same subnet as the print server. However, if the server resides on another subnet, complete this procedure to store the IP address in the print server. Reconnect the print server anywhere on the network, and then use Telnet or the HTML pages accessed by MAP or a Web Browser utility to change the IP address. See 7.5 Running Telnet, for instructions on using Telnet.

3. Find the Ethernet address of the Network Interface Board. The address is printed on the configuration status report each time you turn the printer on.

4. Edit the hosts file (usually /etc/hosts) or use NIS or DIS to add the IP address and [print server's node name. See the network administrator for the IP address. For example, a print server with a name of printfast and an IP address of 192.9.200.200 has the following entry:

   ```
   192.9.200.200  printfast
   ```

5. Add an entry to the arp cache for the Print Server's IP address and Ethernet address. For example:

```
arp -s 192.9.200.200 0:40:c8:0:0:ff
```

6. Check the printer to see that the Print Server is connected to the network. Turn on the printer.

7. Send a ping command the Network Interface Board to verify it is running on the network. For example:

```
ping 192.9.200.200 or
ping printfast
```

The Network Interface Board will not respond to this ping command but it will read its IP address from the packets.

8. Turn the printer off and back on again and then send the ping command again to verify that the print server obtained its IP address. If the Print Server has the address, the result is a confirmation message:

```
192.9.200.200 is alive
```

9. Remove the entry from the arp cache using the following command. Specify the Print Server either by its IP address or by its name. For example:

```
arp -d printfast
```

7.4.2 lpd/lpr Printing

lpd/lpr is an implementation of the standard UNIX line printer daemon which lets you print across a TCP/IP network without the need to install software on your workstation with all filtering and banners done by Network Interface Board. Remote printing uses the same commands (lpr, lpq, lpc) as local printing.

The process begins when the lpr call finds a printer on a remote system by looking at the remote (rm) entry in the /etc/printcap file for that printer. lpr handles a print job for a remote printer by opening a connection with the lpd/lpr process on the remote system and sending the data file (followed by the control file containing control information for this job) to the remote system. The printer-based lpd then filters the data and prints the job according to information contained in the control file and its own printcap file.

Network Interface Board lpd recognizes the format of a certain printer emulations and filters the data, if possible, so it can be printed on the printer type you specify. You can indicate to the Network Interface Board lpd what type of printer is attached to by either:

1. Accepting the default port setting (PCL, PostScript and other), or

2. Changing the listed emulations via the Telnet or the HTML pages accessed by MAP or a Web Browser utility.

The following sections give specifics lpd/lpr setup instructions for various systems.

7.4.2.1 Setting Up a BSD Remote Printer to Use lpd/

To set up a remote printer on the host that sends jobs to Network Interface Board using printer resident lpd, add an entry to the /etc/printcap file on your host for each printer you use. The steps are described below.

1. Open the /etc/printcap file. Make an entry naming the Network Interface Board as the remote host and PORT1 as the remote printer name. A typical printcap entry is shown below:

```
<printer_name>\
   (for example, lprprinter)
:lp=:\
:rm=<remote_host>:\
   (for example, name as entered in /etc/hosts)
:rp=PORT1:\
:sd=/usr/spool/lpd/<printer_name>:
   (for example, spool directory on system used to spool data
   and control files)
```

This entry will send jobs spooled at /usr/spool/lpd/<printer_name> to the printer designated <printer_name> to be printed at port 1 (the internal connection to the printer) of the Network Interface Board designated as <remote_host>.

2. Create the spooling directory. For example, type:

```
mkdir /usr/spool/lpd/<printer_name>
```

3. To print via the spooler, use the lpr command. Type:

```
lpr -P<printer_name>  <file_name>
```

Installation and testing is done. You are now ready to print.

7.5 Running Telnet

The Telnet utility uses the standard remote terminal protocol to configure the IP address, lpd/lpr printers, and other parameters on your system. Use the following guidelines to run Telnet. You have the same functionality with the HTML pages accessed by MAP or a Web Browser, as described in Chapter 3.

- Most often, you make selections from menus by toggling between one choice or another, by selecting/deselecting or enabling/disabling an item.
- Press Enter, when not selecting an item. This will return you to a previous menu.
- If you do not make a menu selection for 2 minutes, you get a "Two Minute Warning" that within 2 more minutes your Telnet session will end. This ensures that one user does not leave a session idle for too long.

7.5.1 Making Connection and Main Menu

1. At the prompt, type:
2. **telnet** <Network Interface Board IP address>
3. When login: appears, type **guest** if you are only interested in browsing the menus or **sysadm** if you want to change the configuration. Press the **ENTER** key.

4. When password: appears, again type **guest** or **sysadm** and press the **ENTER** key.
5. The main menu is displayed. This utility lets you change the IP Parameters, lpd/lpr printers, protocols, restore to factory defaults, and change password. Press the number for the parameter you wish to check or change and press the **ENTER** key.

The Configuration Utility
Unit Serial no. 991398 v2.18
Main Menu
1. IP Parameters
2. LPD Printers
3. Protocols
4. Reset Unit
5. Restore Factory Defaults
6. Change Password
7. Exit
Enter Selection (? for Help) :

To end your Telnet session, type **E** at the Main Menu. If you have made any changes you are prompted to either **Save Changes and Exit** or **Exit Without Saving Changes**. Choose your option and press the **ENTER** key.

Note: *Press **?** to access the Telnet help utility.*

7.5.2 Configure IP Parameters

Although the Network Interface Board must have an IP address before a Telnet Connection can be made, you can use the utility to change the address or the other IP parameters. The Network Interface Board will automatically initiate a soft reset when the IP address change is sensed.

Note: *This will cause the Telnet connection to be broken. It is advisable to make all other desired changes before changing the IP address.*

1. At the Main Menu, type 1 and press the **ENTER** key to bring up the IP Parameters menu (shown on the next page).
2. Type 1 again and press the **ENTER** key. The IP Address submenu will appear:

The Configuration Utility
Unit Serial no. 991398 v2.18 IP Parameters 1. IP Address 2. Subnet Mask 3. Default Gateway 4. Base Port Number Please Enter Selection (? for Help) :

3. Enter a new IP Address and press the **ENTER** key. Repeat the previous steps to change Subnet Mask and Default Gateways.

4. Enter **4** to change the base port number.

Note: *The base port number is one less than the actual TCP/IP port number used by the printer. For example, to set the port number to 9100, enter 9099. You should specify a port number between 1000 and 65530 for compatibility with HTML-based configuration capability, which can be accessed via the MAP or a standard Web Browser.*

7.5.3 Select Printer Languages

Selection 2 in the Main Menu allows you to designate which emulations (printer interpreter languages) the printer supports. This is to allow the resident lpd/lpr to modify files intended for other emulations so that they may be printed. The menu also allows you to enable or disable banners attached to lpd/lpr handled jobs.

The emulation choices are Printer Control Language (PCL), PostScript (PS), ASCII (simple text) and Other (any print job not recognized as PCL, PS, or ASCII). The file modifications and conditions are:

Print Server Setup	Job Detected to be	Action
PCL, (PostScript)	ASCII	<CR> changed to <CR><LF>
PostScript	PCL, Other	PostScript header added
not PostScript	PostScript	Job discarded
PostScript	ASCII	PostScript header added, <CR> changed to <CR><LF>
PCL, PS, ASCII	Any	no action

1. To access the LPD Printers menu, type 2 and press the **ENTER** key. For a unit at factory default, the menu shown below will appear.

The Configuration Utility
Unit Serial no. 991398 v2.1X
LPD Printers
1. Printer 1
2. Banners
Please Enter Selection (? for Help) :

2. To change the set of emulations, type 1 and press the ENTER key. The options shown below will appear.

The Configuration Utility
Unit Serial no. 991398 v2.18
Printer 1 PCL OTHER
1. PCL
2. PS
3. ASCII
4. OTHER
Please Enter Selection (? for Help) :

3. To delete an emulation, select the number opposite the language listed. For example, type **1** and press the **ENTER** key to delete PCL. Typing **1** again will again select PCL.
4. From the LPD Printers menu, press **2** to toggle Banners between Enabled/Disabled.

7.5.4 Enable/Disable Network Protocols

To enable network protocols, at the Main menu type **3** and press the **ENTER** key.

You are given the choice of disabling either NetWare or AppleTalk since both network OS's are enabled by default. For example, to disable Appletalk, type **2** and press the **ENTER** key.

7.5.5 Reset Unit

To reset the Network Interface Board, at the Main menu type 4 and press the **ENTER** key. Then you will be asked whether to reset the card or not with a warning message.

7.5.6 Restore Factory

When it is necessary to restore factory defaults on your print server, choose 5 on the Main Menu and press the **ENTER** key. All NVRAM stored parameters will be returned to their factory default values. The factory default values will not take effect until the Telnet program is exited or the unit is power-cycled.

7.5.7 Change Password

When you want to establish a new password, enter 6 from the Main menu. Type up to eight characters after the New Password query and press the **ENTER** key. Retype the same characters at the Retype New Password query and press the **ENTER** key. Use the Save Changes and Exit option. Once you have established your password using Change Password, the password sysadm will be rejected.

Note: *There is a single maintenance access password to the Network Interface Board. This password is used for both Telnet and HTML maintenance programs. This password may be changed from Telnet or from HTML (accessed either via MAP or Web Browser utility.*

7.5.8 Exit Telnet

Use the following procedures to exit Telnet:

1. To end your Telnet session, type **E** at the main menu. If you have made any changes, the following menu will appear:

The Configuration Utility
Unit Serial no. 991398 v2.18
Exit
1. Save Changes and Exit
2. Save Changes and Reset
3. Exit Without Saving Changes
Please Enter Selection (? for Help) :

2. Choose your option and press the **ENTER** key. For example, type **2** and press the **ENTER** key. The program will save your changes and reset the print server so that the changes will take effect.

Chapter 8 Operation and Troubleshooting

This chapter describes normal operation of the Network Interface Board in the printer, and also provides information on how to troubleshoot any problems you might have with the Network Interface Board.

8.1 LED Status Indicator

The Network Interface Board has two LED status indicators: amber and green. The amber LED generally indicates job activity; it flashes when a print job is being communicated to the Network Interface Board; it is off when no activity is occurring.

The green LED indicates the operating condition of the Network Interface Board when it is powered on during normal operation. The following table provides the conditions that this LED may indicate.

LED Patterns	And the printer is...	Then the NIB...	Operating Condition
Green LED is ON solid.	First powered on.	Is performing self-tests.	Normal
	Awaiting print jobs.	Is functioning properly	Normal
Green LED - blinks 3 times and stays on.	Finished with self-tests.	Prints out status report.	Normal.
Green LED blinks rapidly.	Performing self-tests.	Detects a bad RAM chip.	Error. Contact service representative.
Green LED blinks rapidly 4 times then pauses.	Performing self-tests.	Failed the Ethernet hardware self-test. Check the network.	Error. Check the cable connection and restart the printer. If this error occurs often, contact service representative.

Green LED blinks slowly.	Awaiting print jobs sometime after power-on complete.	Some printer interface error.	Error
Green LED blinks rapidly	Awaiting print jobs.	Has lost its NetWare connection to file server.	Error. Check the cable connection and restart the printer.

8.2 Status Report

The Status/Configuration report is sent as a print job to the printer when the print server is powered on. For example, the report on the next page shows the configuration of the print server immediately after the report is printed. Some printers also allow you to use a command from the front panel that will produce a status report.

It is strongly recommended that you review this report immediately after installation and any time the setup has been changed. If the report does not include a protocol that was configured, check that the procedure was done properly.

```
------------------------------------------------------------------------

Unit Serial No: 992819                      Version: 05.28

Network Address: 00:40:af:79:31:98

Network Topology: Ethernet                  Connector: RJ45

Network Speed: 10 Megabits

Novell Network Information                  enabled
   Print Server Name: P4PRT10_819
   Password Defined: No
   Preferred Server Name: NW41
   Directory Services Tree: SALES
   Directory Services Context: DOMESTIC
   Frame Type: Novell 802.3

Peer-to-Peer Information                    enabled
   Frame Type: Novell 802.3
   Network ID: 291

TCP/IP Network Information                  enabled
   Frame Type: Ethernet II                  Protocol Address: 133.139.133.132
   Subnet Mask: 255.255.255.0               Default Gateway:  133.139.133.10
   DNS Address: 0.0.0.0

AppleTalk Network Information               enabled
   Frame Type: 802.2 SNAP On 802.3
   Protocol Address: Net Number 65384       Node Number 61 Socket Number 129
   Preferred AppleTalk Zone:                Default Zone

------------------------------------------------------------------------

Novell Connection Information

  Printer Name: Printer: P4PRT10_819P

     File Server: NW41
        Queue: P4PRT10_819Q                 Priority: 1   Attached: Yes
        No Notify Defined

Peer-to-Peer Connection Information
   Printer Name: P4PRT10_819

AppleTalk Connection Information
   AppleTalk Printer Name: (Your Printer Name)

TCP/IP Connection Information
   Port Number: 10001

------------------------------------------------------------------------
```

8.3 Resetting the Print Server to Factory Default

You can make the Network Interface Board restore all parameters to factory default values, so the Network Interface Board appears just as it came from the factory. You may choose to do this when the Network Interface Board is moved to a new location where the environment (AppleTalk network zones, NetWare file servers, IP subnets, and so on) are different.

This process is called "Reset to Factory". It can be done with the standard Telnet or HTML (accessed via MAP or a Web Browser) utility.

Note: *Resetting to factory default means that the print server loses all data such as names and IP addresses. It does not lose its serial number or MAC (Ethernet hardware) address. After resetting to factory default, be sure to turn the printer off and on.*

8.4 How to Diagnose Problems

Use the following list to determine the cause of printing problems:

1. Verify that the printer is functioning properly.

• Is the printer printing? Make sure the printer is operating properly by causing it to generate a test page. See your printer's owner's manual for instructions on generating a test page.

• Is the printer on-line? Verify that the printer is on-line or else nothing will print.

• Does the control panel display an error message? Review the printer documentation for an explanation of the error messages.

• Did you get a Network Interface Board status page? On power-up, the Print Server sends a status page which may contain information that can be useful for troubleshooting. Keep the status page available until a problem is resolved.

Note: *The start-up Configuration and Status Page from the Network Interface Board may be disabled via the MAP or a Web browser.*

2. Check the Network Interface Board's LED status indicator to ensure that there is no error condition. See 8.1 LED Status Indicator, for more information.
3. Check the status report to see what protocols are enabled and active. See the appropriate chapter to confirm that you have installed and configured your network protocol correctly for the Network Interface Board. See 8.2 Status Report, for an example of the status report.
4. If you added, changed, or removed any new hardware on the network, verify that it was installed correctly.
5. If you added any new software applications, make sure the program is compatible and installed correctly on the network. See your network protocol documentation to confirm.
6. Determine if other users can print. If they can't and they are all on the same NOS, go to the troubleshooting section for that NOS.
7. When you have determined the nature of the problem, use the checklists in the next section.

8.5 Troubleshooting Checklists

Use the checklists in this section to identify and solve problems.

8.5.1 Troubleshooting Network Hardware Connections

- Check that the network connector is plugged into the RJ connector on the Network Interface Board.
- Try another cable to make sure you do not have a bad cable.

8.5.2 Troubleshooting NetWare Protocol

It is recommended you use MAP to get the NetWare setup and parameter values. If you have not resolved the problem after running MAP, go through the checklists in this section.

8.5.2.1 NetWare Checklist

- Is the print server name entered correctly? The factory-default name is RDP-serial number. The serial number label is located on the board.
- Did you assign print queues to the printer? It is recommended you assign each print queues to only one Network Interface Board-connected printer. If print queues are assigned to other network printers, the print jobs may be going to an other network printer.
- Did you assign the printer to the type Remote Other /Unknown?

If the PCONSOLE settings are correct, the connection between the printer and network may have been broken. Turn the printer off and, using PCONSOLE, wait for the status message Not Connected. Turn the printer on and the status should change to Waiting for Job.

8.5.2.2 File Server Checklist

- Is there enough disk space on the file server and is it running?
- Is the correct file server associated with the printer? Use PCONSOLE to check this.
- Did you have the proper rights to configure the printer?
- Are the File Server and the Print Server communicating?

Run NetWare's COMCHECK utility from any network workstation to check this.

- Are there enough user positions on the File Server? The Print Server function logs on as a user.

8.5.2.3 Workstation Checklist

- Is the network loaded onto the workstation? See the NetWare documentation.
- Is the application set up to print to the printer? For instance, are you using the correct driver?
- Is the workstation connected to the correct print queue? Print a file and verify that the file goes to the queue.
- Are the print queues assigned to the Network Interface Board-connected printer also assigned to another network printer? If they are, the print jobs may be going to that printer.

- From PCONSOLE, enter a sample print job directly into an assigned queue. Does the job become Active? Is job printed?

- Is AUTO ENDCAP enabled? Auto Endcap lets you send data to a network printer. Use PRINTCON to check. If not, enable it.

8.5.2.4 Network Interface Board Configuration Checklist

If all your hardware connections are correct, check the following:

- Use MAP to check the status of the print server. The Unit Status screen shows the status for the selected network interface card. This report includes a status of file servers and queues assigned to a printer along with a description of any problems.

- The printer may not be assigned to the correct print queues. Use PCONSOLE to direct print jobs to the correct queues, then check to see if the print job is in the queue.

- If devices were added or changed, use PCONSOLE to make sure you configured the new devices correctly.

- Make sure the Network Interface Board's name has been entered correctly. If you changed the name in MAP, you must also change the name in PCONSOLE before you can print.

- Use PCONSOLE to check the Printer Status. Make sure it is not stopped or paused.

- You cannot use PCONSOLE Version 1.0 to configure the network interface card. Contact Novell for an upgrade.

8.5.2.5 Printer server/file server/printer Checklist

Check the following to see if:

- The Network Interface Board can not log into the file server, or cannot service jobs from a File Server.

- The Print Server name is listed on that File Server, or cannot service jobs from a File Server.

- The password assigned to the Network Interface Board through PCONSOLE matches the password assigned through MAP. Use MAP to update the password stored in the network Print Server's memory.

- The print job is in the print queue and waiting to be printed. Use PCONSOLE to check if the print jobs are being sent to the printer.

8.5.2.6 Workstation to Network Interface Board Connection Checklist

To make sure the workstation is communicating with the Network Interface Board, check the following:

- Print a file from the workstation and make sure the print job gets to the print queue using PCONSOLE. If the print job does get to the queue, the problem is not with the workstation/print server connection.

- Use CAPTURE to send data to the printer from a workstation software application. See your NetWare print server manual for information.

- Make sure another printer is not taking the print jobs from the queues BEFORE the Network Interface Board can service the job. To do this, disable the other printer until you can verify the Network Interface Board-connected printer setup.

8.5.2.7 Network Interface Board Loses Its File Server Connection

If the Network Interface Board loses its connection to the file server, it can take approximately 5 to 10 minutes to reconnect. If the connection is not made after a reasonable amount of time, check the error conditions to troubleshoot the problem.

8.5.2.8 Unable to Print from a Different Context

The Network Interface Board does not support printing from a context different from the context you are installed upon. If you want to do this, you must create an alias queue. See your NetWare Manual for more information.

8.5.3 Troubleshooting AppleTalk Protocol

- Is the Macintosh computer connected to the network through Ethernet, and, has the Macintosh AppleTalk driver been selected? Go to the Control Panel, then go to Networks to check.
- Did you select the correct Network Interface Board and correct zone?
- Is AppleTalk enabled on the Macintosh? Use Chooser to check this.
- If you are on a network with multiple zones, is the zone correct?
- Did you select the correct printer driver in Chooser? You must first select the printer icon and then select the printer name.

Note: *Not all printers will communicate with the default Macintosh driver.*

- If you renamed the printer, did you reselect the printer under its new name?
- If you placed the printer in a new zone, did you reselect the zone?
- Are there other printers with similar names in the Chooser? Make sure you chose the Network Interface Board-connected printer.

Appendix A

Specifications

A.1 Network Interface Board

The following tables provide general specifications for the Network Interface Board.

Size:	120.9 mm length x 89.9 mm height 4.760 in. x 3.540 in.
Weight:	approximately 240 gm. approximately 9.6 oz.
Controls and Indicators:	One green LED and one amber LED
Configuration:	Stored in non-volatile memory
Connectors:	Ethernet: 8-wire RJ-45 10BaseT/100BaseTX

A.2 10BaseT/100BaseTX/STP Cables

Use the following universal Ethernet standard when configuring your 10BaseT/100BaseTX/STP cables to connect to the RJ45 connector on the Network Interface Board. The cable should be Category/Type 5 or better (depending on length).

Pin Number	Color	Ethernet
8	blue/white	
7	blue	
6	orange/white	Receive –
5	green/white	
4	green	
3	orange	Receive +
2	brown/white	Transmit –
1	brown	Transmit +